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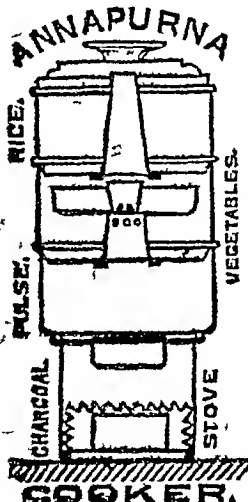
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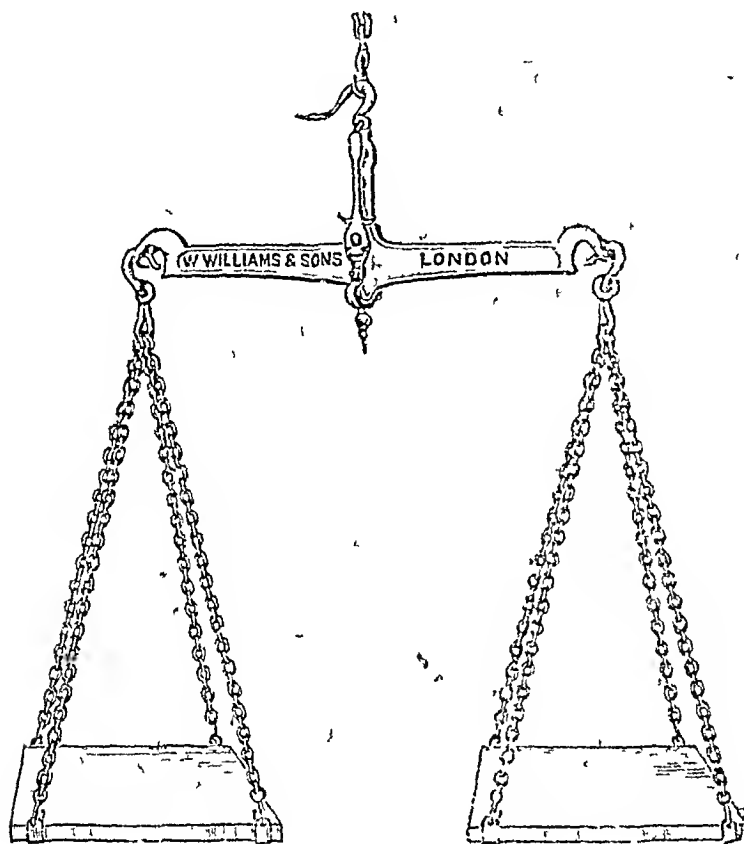


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**REPORT**  
**OF**  
**THE TWELFTH**  
**INDIAN INDUSTRIAL**  
**CONFERENCE**

**HELD AT LUCKNOW,**

**ON THE**

*30th December, 1916*

**PUBLISHED BY THE HON'Y JOINT SECRETARIES**  
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the Hon'ble Mr. Manmohandas Ranji, Hony Joint Secre-  
taries, Indian Industrial Conference, 7 Green Street,  
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## FOREWORD

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In presenting the Annual Report of the Indian Industrial Conference for the year 1916, we take the opportunity of drawing public attention to the work of the Conference for the last 12 years. The field covered by the activities of this Conference is a comprehensive one, and as it is necessary to maintain a permanent staff for carrying on the work throughout the year, it is necessary to realize funds from the public in order to meet the expenses of the office and the publication of the reports, which can be only partially covered by the sale of our publications. There is again a large amount of work in new channels which can be undertaken, if only the funds permitted. To give an example in point, some of the several publications brought out by the Conference have gone out of stock. There is a large demand from the public for these and it is necessary for the Conference to bring out a new Edition as soon as the present shortage of paper due to war conditions no longer exists. The publication is bound to entail a large initial outlay. To the intelligent readers to whom the pages that follow will be full of valuable information, in all matters that pertain to Commerce and Industry, with the progress of which the future of our country is vitally bound up, we appeal, therefore, for a generous contribution towards the funds of the Indian Industrial Conference.



## List of publications supplied to the Indian Industrial Conference office, Fort, Bombay.

### Government Gazettes —

- (1) The Gazette of India.
- (2) The C P Gazette, Nagpur
- (3) The U P Gazette, Allahabad
- (4) The Bombay Gazette Bombay
- (5) The Fort St. George Gazette, Madras.
- (6) The Burma Gazette, Rangoon.
- (7) The Calcutta Gazette, Calcutta
- (8) The Sind Gazette Karachi.
- (9) The Coorg Gazette

### Monthly Magazines —

- (1) The Indian Review, Madras
- (2) The Wealth of India, Madras.
- (3) The Hindustan Review, Allahabad
- (4) The Indian Trade-Journal, Bombay.
- (5) The Indian Textile Journal, Bombay.
- (6) The Science and Industry, Bombay
- (7) The Mysore Economic Journal, Bangalore.
- (8) Monthly Accounts of trade by Land of British India
- (9) The Journal of the Indian Merchant's Chamber and Bureau.

### Newspapers —

- (1) The Indian Patriot, Madras.
- (2) The Sun, Rangoon.
- (3) The Sundesh, Bombay
- (4) The Message, Bombay.
- (5) The Indian Mirror, Calcutta
- (6) The Bengalee, Calcutta,
- (7) The Leader, Allahabad.
- (8) The Jagatvritta, Bombay

Other Periodicals —

- (1) Agricultural Journal of India and Bulletins issued by Agricultural Research Institute Pusa and by the Agricultural Departments of the Bombay, U. P. and other Provinces
  - (2) Bulletins issued by the Imperial Forest Department.
  - (3) All the important Blue Books issued by the Commercial Intelligence and Statistical Departments of Government of India.
-

# CONTENTS.

	PAGE.
Introduction ... ..	1-XX
Summary of proposals and suggestions .. ..	XXI
Resolutions passed at the 12th Conference ... ..	1
Proceedings of the 12th Indian Industrial Conference ... ..	7
Speech of the Chairman of the Reception Committee ... ..	9
Presidential Address of the Hon'ble Rai Sitānath Roy Bahadur C I E ... ..	17
Presentation of the Annual Report by the Hon'ble Rao Bahadur R. N. Mudholkar, C I E., the General Secre- tary of the Indian Industrial Conference ... ..	32
Adoption of the Report ... ..	34
Submission of the Papers .. ..	36

## SPEECHES ON THE RESOLUTIONS.

<i>The First Resolution.</i> —(Condolence for the death of Hon'ble Munshi Prag Narain Bhargava) .. ..	38
<i>The Second Resolution</i> —( Condolence for the death of Mr G. Subramania Iyer ) .. ..	,,
<i>The Third Resolution</i> — <i>State Management of Railways.</i>	
Sir Vithaldas D Thackersey Kt. . . . .	39
Mr. A Rangaswamy Iyengar ... ..	41
<i>The Fourth Resolution Industrial Commission.</i>	
The Hon'ble Mr O V. Mehta .. ..	43
Mr. O Gopal Menon ... ..	44
<i>The Fifth Omnibus Resolution.</i>	
Hon'ble Rao Bahadur R N Mudholkar ... ..	,,
<i>The Sixth Resolution Constitution of the Conference.</i>	
Pandit Vidya Sagar Pandya .. ..	45
Dewan Bahadur L A. Govinda Raghava Iyer .. ..	,,
<i>The Seventh Resolution ( Appointment of Office Bearers.</i>	
The Hon'ble Pandit Madan Mohan Malaviya ... ..	,,
Mr. Dhuni Chand .. ..	46



*Vote of Thanks to the Chair.*

Mr. J. B. Petit	...	...	...	...	47
-----------------	-----	-----	-----	-----	----

## THE PAPERS.

(1)	Economics of Indian Agriculture and Industry · By <i>Keshavlal L Oza, Esq., M. A. Junagad..</i>	...	1
(2)	Sugar Problem in India, with special reference to the U. P. · By <i>R. R Sanghi, Esq., Cawnpore</i>	...	24
(3)	A few suggestions regarding the increase of sugar production in U. P Agra and Oudh By <i>Ba'u</i> <i>Mukhtar Singh, Meerut</i>	...	37
(4)	The development of minor industries in India with special reference to Wood-working industries · By <i>H E Kinns, Esq, Bareilly</i>	...	58
(5)	The Swadeshi movement By <i>M B Sant, Esq, Bombay</i>		63
(6)	The early history of cooperative credit, its main principles and advantages and their application to India By <i>Babu Shivacharan Lal, Gwalior</i>	...	70
(7)	Insurance drain on India, how to prevent it By <i>W.</i> <i>T. Halai Esq., Bombay</i>	.	74
(8)	On life insurance in India, By <i>P. C Mulherji Esqr.</i> <i>Lucknow</i>	..	80
(9)	Rusa Oil industry By <i>H R Pithe, Esqr., Akola</i>	...	87
(10)	Paper manufacture By <i>Ahmed Husan Esqr., Lucknow</i>		94
(81)	Paper industry By <i>H D Singh Esqr., Lucknow</i>	..	104
(12)	Plantain Fibre industry By <i>J N Banerji Esqr.</i> <i>Calcutta</i>	..	108
(13)	Glass manufacture By <i>Rai Sahib Lala Panna Lal,</i> <i>Ambala City</i>	...	112
(14)	The possibilities of Perfume industry in India By <i>J. P Sivastava, Esqr. Cawnpore</i>	...	136
(15)	Importance of modern inventions and discoveries By <i>N M Sant, Esq, Bombay</i>	..	142
(16)	Coaltar dyes and India By <i>Lala Babulal Govilla,</i> <i>Gwalior</i>	..	147
(17)	The present position of Indian chemical industries By <i>Professor N N Godbole, Lahore</i>	...	155
(18)	The Value of Research By <i>Dr. Harishchandra, Dehra</i> <i>Dun</i>	...	170

- (19) First three Essentials of industrial development and the need for a bussiness education *By S S Gill, Esq., Lucknow* .. 181
- (20) A note on the improvement of the indigenous oil industry in the Bombay Presidency *By N S Upasani, Esq., Bombay* 185

## Appendix I.

Resolutions passed at the Previous Conference Sessions, from the First to the Eleventh ( 1905 to 1915 ) .. i-xlv

## Appendix II.

List of delegates to the Twelfth Indian Industrial Conference . ..

REPORT ON THE WORK OF THE INDIAN INDUSTRIAL CONFERENCE AND RECORD OF THE GENERAL INDUSTRIAL ACTIVITY IN THE COUNTRY IN THE YEAR ENDING WITH NOVEMBER 1916 .. 1 to 68

INDEX ... ..

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## INTRODUCTION.

"All the important countries in the world have risen to their present industrial eminence by a well-organised system of State-aid and protection in the earlier stages. Why should India alone be an exception? Unless, therefore, the Government helps our industries by financial assistance, expert advice, wide diffusion of secular, technical and industrial education, internally, and by imposing prohibitive duties on foreign articles which can be manufactured in India, externally, I, for one, have no hope of seeing Indian Industries developing properly"—*Address of the late Hon'ble Prag Narain Bhargava Rai Bahadur, Chairman of the Reception Committee*

"Efficiency of industrial organisation depends in a very large measure on the moral and intellectual qualities of the persons in whom control and responsibility are vested. Unfortunately, we very often find that the Directorate Boards of many of our industrial concerns are composed of men, who cannot bring to their work expert knowledge which is so essential for successful management"—*(Presidential address of Hon'ble Rai Sitanath Roy Bahadur)*

"Not the people alone but the Government of India have grasped the essential needs of the situation and we hope we shall strive together in perfect accord towards the attainment of the ideal before us. And in this connection the labours of the Industrial Conference through a long series of years have not been altogether thrown away. We have appealed to and awakened the national consciousness of our people. I see signs on all sides of its being thoroughly roused. I see before me the picture of an awakened India. I see her teeming millions working in her mines and her factories dotted all over her surface, along the banks of her mighty and majestic rivers and along her sea-washed shores, I see them bringing to the cultivation of her ancient soil new discoveries of science and I see her green pastures and irrigated fields no longer at the tender mercies of uncertain monsoons, I see again that old-time wealth of India, her immense herds of cattle, better bred, better fed, and better preserved, not swept away with her men when the rains fall, I see her cottages once more full of busy life, I see the gaunt spectre of famine stalking away from her fair face, I see the Indian and distant seas ploughed once more by Indian ships manned by Indian crews, navigated by Indian mariners, and laden with Indian merchandize, I see India bringing again to distant nations through routes on land and sea the great gift of a spiritual civilization which the nations of the world are vainly seeking to attain—(*Ibid*)

The Twelfth session of the Indian Industrial conference was held at Lucknow on Saturday the 30th December 1916 under rather inauspicious and unfavorable circumstances. The late Hon'ble Munshi Pragnarain Bhargava, who had accepted the Chairmanship of the

Reception Committee in charge of the organization of the conference succumbed at Calcutta to a fell disease only 6 days before the sitting of the conference. Babu Mukut Biharilal and the other office bearers of the reception committee, who were closely connected with the late Chairman could not for obvious reasons, take an active part in arranging the affairs of the Conference as they could have done at other times. Owing to the absence of enthusiastic or influential local workers on behalf of the Industrial conference, it did not succeed in arranging to hold the conference one or two days before the Congress Session. Several important questions like the Home Rule Resolution were agitating the minds of the Congress delegates, who had assembled at Lucknow from the different Provinces, hence they could not devote undivided attention to functions like the Social and Industrial Conferences which are generally accorded a place of secondary importance. The Preliminary arrangements in connection with this session were made by Babu Mukut Behari Lal Bhargava, one of the secretaries of the Reception Committee aided by Mr. M. B. Sant, Asst Secretary of the Conference, who had proceeded to Lucknow in advance for this purpose.

The thanks of the Industrial Conference are certainly due to the Hon'ble Pandit Gokarna Nath Misra for his readily consenting to take up the place of the late Hon'ble Munshi Prag Narain Bhargava as Chairman of the Reception Committee.

The address of the Chairman which was read by Pandit Gokarna Nath Misra, is a very able utterance as will appear from the short summary given below.—

Rai Bahadur Bhargava pointed out that although Lucknow was not a big commercial or manufacturing centre like Bombay, it possessed special manufacturing industries, which though small yet were unique in their own way, and covered an extensive field. The manufacture of cotton fabrics of all kinds from the coarsest cloth to the finest muslin, still gave employment to a large population, though their number is year by year declining. The Muslin of Lucknow is still used as ground work for the celebrated *chikan* and embroidery work and is preferred by local artisans. Cotton printing is also in a flourishing condition. Ivory carving, wood carving, clay modelling, manufacture of tobacco and perfumery are still lucrative industries of Lucknow. One of the successful

ventures of a modern type was the Upper India Couper Paper, Mills giving employment to nearly 600 persons a month. In the year 1916, this factory manufactured about 3000 tons of paper a record production since its start in 1879. This paper Factory, Lucknow Iron Works and a few printing Presses, are some of the concerns with which late Munshi Pragnarain was directly connected. Ice Factory, Oil and Flour Mill, were the other modern industries of Lucknow. A company has been lately started for the manufacture of Paper pulp from grass.

After describing the industrial activity of Lucknow, Mr Bhargava turns his attention to economic questions of general importance like the fiscal policy of Government and was of opinion that "in a country, the developments of whose industrial resources has just begun, the policy of unrestricted free trade, was most detrimental." A well organised system of state aid and protection were quite essential in the earlier stages. India in fact stood urgently in need of fiscal autonomy.

In the expansion of paper Factories, the Industrial Conference, should in his opinion, urge upon the Government the advisability of introducing the manufacture of chemicals and suitable machinery.

The question of Railway freights was next dealt with. The policy of the Indian Railways to provide facilities for the European traders and encourage foreign industries and to throw impediments in the growth of Indian manufacturing concerns, was severely criticized. Turning to the problem of banking, currency and finance, the Rai Bahadur objected to the policy of the Secretary of State for India of lending Indian money in England at nominal rates of interest, as it could in India have fetched double the rate, at which it was invested in England.

In regard to the Industrial Commission, which has been appointed by the Government with Sir Thomas Holland as its President, Mr Bhargava complained that it had excluded from its scope the question of the Tariff reform.

After the reading of this address by Pandit Gokarnath Misra was over, the Hon'ble Rai Sitanath Roy Bahadur was duly elected as President of the Conference. The Presidential address of a veteran industrialist and student of Indian economic problems,

like Rai Sitanath Roy Bahadur fully justified the high expectations of the public, as it covered a very wide range and can be placed on a par with some of the best utterances from the platforms of previous Conferences

After a brief survey of the Indian industries and alluding specially to the Artha Shastra of the great writer Chanakya, the President points out that beginning from the Ohristan era, through the middle ages, down to the 18th Century. Indian products and handicrafts were valued everywhere and it was the richest country on earth. But from the end of the 18th Century, India began to lose her commercial supremacy, owing to the (1) revolution in the methods of production, as the result of inventions in Europe, and Machinery supplimenting hand labour, (2) Efforts of the East India Company to systematically throttle Indian industries by all means fair or foul, (3) unwillingness of India to adopt new methods, (4) Cheapness of production of Lancashire. In the opinion of the President, the chief requisites for industrial development are :—

- (a) Natural resources.
- (b) Labour of various grades.
- (c) Technical Knowledgo.
- (d) Capital.
- (e) Machinery.
- (f) Organization
- (g) Markets
- (h) Transport facilities.
- (i) State-aid
- (j) Business enterprise.

India possesses natural resources in abundance, as the soil is fertile and capable of yielding a largo variety of agricultural and forest products, though the soil conditions are not the same in every province. The country is also rich in mineral resources scattered over different tracts. With regard to labour, it is abundant in some parts and scarce in others. To secure its mobility, it is necessary in his opinion to cheapen Railway fares and make factory life more attractive. Labour requires industrial training to increase its efficiency. There is also the need of expert knowledge in the country, which cannot be secured, unless there are Technical

colleges for the training of industrial experts and supervisors and foremen. The President has also advocated the establishment of one fully equipped Technological Institute for teaching the higher branches of industrial science with arrangements for practical training in mills and factories. India office which purchases large quantities of stores from British factories ought to insist on the admission of Indian Apprentices into Railways and other workshops

For the success of new undertakings, instead of placing them under the charge of inefficient Indian managers, on the sole ground that they are indigenous, it would be more advantageous to place them in charge of foreign experts

The question of capital has been next dealt with. The shyness of Indian capital is, in his opinion, due to the following causes —

- (1) Want of confidence in the capacity of promoters
- (2) doubtful nature of the concerns
- (3) a large proportion of the little capital that is available is invested in other businesses where it fetches decent rates of interest
- (4) Industries are started sometimes with undersubscribed capital
- (5) Greater portion of the capital becomes fixed in the shape of building, and machinery and very little fluid capital is left to meet working expenses

The Government can help now concerns, by

- (1) lending their support to them and thus infusing confidence in the public mind.
- (2) the extension of banking system by establishing one State Bank for the whole of India with branches at all important centres or a State Bank for each Province

We may also avail ourselves of the foreign capital, on condition that we pay only the interest and do not allow the profits to leave the country under any circumstances

The machinery that we use must always be of the latest type, any attempt at false economy in this direction, is sure to lead to an ultimate failure. There is also the need of a sound organization



under expert businessmen. To produce such men, commercial and technical education should be diffused in the country. The steadiness and certainty of market is a very important factor and we possess a great advantage in this respect, owing to a demand for all kinds of goods within the country itself. Importance of transport facilities is next pointed out. Cheap freight, quick despatch, and careful handling of goods, are quite essential. The management of Indian Railways should be taken over by Government from private companies to remedy the complaints against the present railway administration and the anomaly of inequitable railway rates. Water transport should also be utilized whenever possible.

To follow the example of the other civilized countries, the Indian Government should also

- (1) grant subsidies to struggling new ventures,
- (2) set up model demonstration factories
- (3) pioneer new industries
- (4) Government Banks should grant loans to industrialists on easy terms,
- (5) provide transport facilities,
- (6) guarantee a reasonable rate of dividend
- (7) encourage local industries by purchasing local manufactures
- (8) grant economic independence and national safety in case of war

While discussing the importance of larger ventures, the President has not lost sight of the handicrafts and cottage industries, as they should not be allowed to die. Where extreme care and delicate handling are required, hand work possesses natural advantages over the machine. The following methods should, in the President's opinion, be adopted for the encouragement of small industries —

- (1) Use of small labour saving machines
- (2) Opening of small factories
- (3) Use of the cooperative credit facilities,

- (4) Government should supply machinery on hire purchase system
- (5) Government should sell raw materials at whole sale prices
- (6) Adoption of the commission system
- (7) Provide employment to women of the middle class
- (8) Utilization of the salesmen and middlemen for the sale of articles
- (9) Organization of fairs or exhibitions in convenient centres

In the concluding portion of his address, the President has paid a glowing tribute to the Indian Industrial Conference for its labours through a long series of years, as it has appealed to and awakened the national consciousness of our people

The graphic description of a resuscitated India may thus be given in his own words —

"I see before me the picture of an awakened India I see her teeming millions working in her mines and her factories dotted all over her surface, along the banks of her mighty and majestic rivers and along her sea-washed shores, I see them bringing to the cultivation of her ancient soil, new discoveries of science and I see her green pastures and irrigated fields no longer at the tender mercies of uncertain monsoons, I see again that old-time wealth of India, her immense herds of cattle, better bred, better fed, and preserved, not swept away with her men when the rains fail, I see her cottages once more full of busy life, I see the gaunt spectre of famine stalking away from her fair face, I see the Indian and distant seas ploughed once more by Indian ships manned by Indian crews, navigated by Indian mariners, and laden with India merchandize, I see India bringing again to distant nations through routes on land and sea her great gift of a spiritual civilization, which the nations of the world are vainly seeking to attain, and may I close in the prophetic words of a poet and seer—"Methinks I see in my mind a noble and puissant nation rousing herself like a strong man after sleep, and shaking her invincible locks Methinks I see her as an eagle renovating her mighty youth and kindling her undazzled eyes at the full mid-day beam purging and unscaling her long deceived sight at the fountain itself of heavenly radiance "

The number of papers submitted to the Lucknow Conference was considerably large and varied in its nature We shall deal with these papers *seriatim*

The first place in the series has been assigned to the paper contributed by Mr Keshavlal Oza on "Economics of Indian Agriculture and industry" In the course of treatment of his subject, Mr. Oza is not content to confine himself to Agriculture alone but has traversed the whole ground of the economic outlook of India.

Within the circumscribed limits of an introduction, it is not possible to do justice to Mr Oza's paper Quoting Gibbon, the writer points out that "Agriculture is the foundation of manufacture, since the productions of nature are the materials of art" The object of the paper is "to suggest a scheme of social reconstruction in which health, recreation, a broader education, a fair wage and a decent standard of living will be assured to the toilers in the fields and in which the varying factors in heredity and environment will be so harmonized that the eradication of pauperism, disease, vice and crime will no longer be achieved by the old method of trial and error"

How far the author has succeeded in his attempt can be gauged only by a perusal of the whole paper We can only touch upon a few salient points In his opinion, the following conditions are necessary for the progress and prosperity of our rural population —

- (1) A Uniform system of land tenure
- (2) A Practical scheme of small proprietary holdings
- (3) An amended fiscal system, safeguarding the true interests of Indian agriculture and industries against the desolating band of foreign rivals
- (4) Consistent state encouragement to agriculture with the co-operation of private capital and private philanthropy
- (5) Revision of the present system of public education
- (6) Cultivation of waste lands
- (7) Preparation of Annual Returns of cropping and live stock and institution of agricultural surveys
- (8) Application of co-operative principles to agricultural industries.

In the course of his paper, Mr Oza has expressed his views on the development of nascent industries including

- (a) The cotton industry
- (b) The silk industry
- (c) The sugar industry
- (d) The textile industry
- (e) Minor or subsidiary industries
- (f) The labour problem

The paper also abounds in several important suggestions which may be duly taken into consideration both by the Government and the people

Mr R R Sanghi, the Sugar chemist to the U P Government and Babu Muktar Singh, Pleader of Meerut, have each contributed a paper on the Sugar industry, with special reference to the condition of the industry in U P. As both the writers belong to the same Province and have worked nearly on identical lines, there is much that is common to both the papers, which, however, deserve to be carefully studied by prospective manufacturers as well as others interested in the advance of the Sugar industry in our country. The papers contain Statistical information, relating to the import and export of Sugar, and also regarding

- (1) Mode of Cultivation.
- (2) Conditions of temperature.
- (3) Amount of Irrigation.
- (4) Description of the Machines.
- (5) The need of expert advice and research work.
- (6) The Methods of sugar making in foreign countries.

The methods of bringing the canes into the central factory and their subsequent manipulation are all described in detail and the two contributions will amply repay a careful study.

We now proceed to "The development of minor industries in India, with special reference to wood-working industries" which is the title of the paper contributed by Mr. H E Kinns, Superintendent Government Carpentry School, Bareilly. The paper reveals the author's intimate knowledge of the subject treated therein. Mr. Kinns points out that "exploitation of Indian timbers presents many commercial possibilities, which should provide profitable

employment for Indian labour and capital" The Indian forests abound in varieties of timber which are suited for the various types of furniture, large quantities of which are yearly imported into India, especially (1) Bentwood, (2) Cane (3) Bamboo furniture deserves our special attention

Similarly large quantities of wooden toys and turnery which annually find their way into the country from Japan and other places, might very well be made in India and this industry owing to the light nature of the products, can successfully be run in hilly places like the Kumaun District His suggestions may be summarized thus —

- (1) In connection with wooden toys industry, families should specialize in the making of various lines of toys or their parts as is done in Japan and Europe
- (2) Government should render help in supplying timber at nominal rates and also in regard to the marketing of the products
- (3) There is also much scope for the manufacture of Packing cases, Bobbins and several other articles

Mr M B Sant, the Assistant Secretary to the Indian Industrial Conference, Bombay, has contributed this year a paper on "The Swadeshi movement" Mr Sant exhorts his countrymen to study this question carefully and to persist in reducing to practice what we have been preaching so long" In his opinion the movement in its genuine form attempts

- (1) to conserve old industries by introducing improvements
- (2) to start new ones
- (3) to create a permanent market within the country for the indigenous goods

Swadeshim being the most non-controversial subject, ought to appeal to all races and creeds alike. It throws responsibilities both on the producer and the consumer of goods and unless this is properly realized, no attempt to prop the movement on mere sentiment alone will ever succeed Some of the causes of the failure of this movement may be enumerated thus:—

- (a) Want of Expert Knowledge
- (b) Low Commercial morality
- (c) Shyness of capital
- (d) Want of proper investigations before any ventures are started
- (e) Lack of proper Advertisement

According to Mr. Sant, our first duty is to organize and combine and adopt the following measures —

- (1) To open shops in all important centres for the collection and sale of country made articles.
- (2) To establish standing Exhibitions of country made goods and products of art
- (3) To collect specimens of foreign goods for the instruction of artisans to serve as models for imitation.
- (4) Determination of people to purchase only Swadeshi goods
- (5) To organize Exhibitions of Machinery

We next pass on to the paper of Babu Sivacharan Lal on "the Early history of co-operative credit, its main principles and advantages and their application to India" Mr Shivecharan Lal traces the history of the movement from 1849 and gives a connected account of its rise and spread in the European countries and its adoption in India. Although agriculture is the first thing that should draw the attention of Co-operative Societies, organization for the purpose of credit should lead to other national and rural activities, such as small industries, primary education, sanitary measures, medical and charitable relief. The total number of societies is nearly 15000 in British India. Most of the leading Indian States have introduced Co-operative Societies within their territories.

The subject of Fire and Life Insurance has attracted two writers this year. Mr W T Halai, contributes his paper on "Insurance drain on India and how to prevent it", and Mr P O Mukerjee, on "Life Insurance in India". Mr. Halai points out that it is the mill-industry of India, which pays the highest premia. The Rates that mills pay for the insurance of the various parts, building, plant, machinery &c. vary from 2 annas per cent per annum to 56 annas.

The city of Bombay alone pays (according to Mr. Halai's computation) 2½ crores of Rupees per year. Even a Mill of moderate output has to pay Rs 20 to 25 thousand on the item of insurance alone, cotton being an inflammable substance has to be insured at every stage and all the premia for insuring cotton, cereals and all other stores which are generally insured, go into the pockets of foreign companies

Mr Halai points out that this business does not require large capital or intricate machinery. There are not even half a dozen Indian Insurance Companies in the whole country; whereas there were before the war, not less than 67 foreign Fire Insurance Companies. The scheme that he has submitted for the starting of Fire insurance concerns deserves a careful consideration at the hands of capitalists so

The main object of the contribution of Mr. P. C. Mukerji is to impress on the mind, of the people of the middle classes the advantages and the necessity of life assurance, which he defines as a contract for indemnifying the insured person or his heirs the loss sustained by him or them on the death of the assured. In its initial stages, the assurance companies restricted themselves to the assurance of human lives only, but in process of time, this principle is now applied practically to every conceivable form of contingency, which can now be met and provided for by various combinations.

In conclusion, he gives a few hints to those who intend to insure their life.—

- (1) Do not be guided in your selection of a life office by the cheapness of premium alone.
- (2) Select an office that bears a wide and good reputation
- (3) Do not choose a company, only because it is Indian, but make sure it is a good one
- (4) If you are required to pay an extra-premium, don't imagine that you know more about it than the Directors
- (5) If your life is declined by one office, try another.
- (6) Never conceal any fact in your dealings with these companies
- (7) Once you are assured, never give it up.

- (8) If you get into temporary difficulties, don't borrow on your policy.
- (9) Don't assure in an office, that promises as surrender value a return of 50 percent, of the premiums paid or other extravagant proportion
- (10) When assuring, do so for the largest amount that you will be able to keep up
- (11) Pay your premiums promptly, don't wait for grace days.
- (12) Don't imagine that in insisting upon legal proofs and other formalities, a life office is trying to cheat you.

Rusa Oil industry is the subject selected by Mr H. R Pitke, for his paper Mr Pitke points out that apart from the cotton cultivation, which is the main and highly remunerative industry of Berar, there are nearly 15 other subsidiary industries including extraction of Rusa oil It appears from this paper, that the Forest Department auctions annually the right to extract oil from Rusa grass and the lessees either do it personally or sublet this right to petty contractors. Mr Pitke gives interesting information in connection with

- (1) The process of the manufacture of this oil
- (2) The localities where the grasses are found
- (3) The different species of Rusa grass, and their properties
- (4) The method of its collection
- (5) Seasons for cutting them
- (6) The average amount realized by Government by the sale of the grasses since 1894
- (7) Prices fetched by the different varieties in the market
- (8) The scope for the improvements of this industry

The subject of paper manufacture has been dealt with by two writers, Messrs Ahmed Hussein and Mr H D Singh, both of whom belong to the Upper India Couper Paper Mills, of Lucknow The two contributions if read together will be found to contain much valuable information on the following points,—



- (1) The old methods of paper making both in India and in foreign countries.
- (2) The changes introduced by the advent of machinery
- (3) Sources of raw material in India for paper making.
- (4) Localities where this industry was formerly in a flourishing condition.
- (5) Chemicals, clay, colors and other materials required for paper making
- (6) Need for the establishment of big factories to manufacture paper pulp.

Mr H D. Singh suggests the adoption of the following measures for the production of cheap paper in India, so that it may compete with the foreign imports —

- (1) Big factories should be established to turn out Machines, Boilers and other parts of the plant required for manufacture of paper
- (2) Every kind of chemical for this industry or its effective substitute should be produced here
- (3) Railway Rates and octroi duties should be so re-adjusted that they will not hamper the Indian Paper Mills
- (4) The Patronage of Government to the Swadeshi paper should be secured
- (5) A combination among Indian Paper Mills to stop unhealthy competition

Mr J N Banerjee calls the attention of his countrymen to the possibilities of the "Plantain Fibre industry." It appears that various processes, both mechanical and chemical have been devised for extracting the plantain fibre. The District of Chingleput in the Madras Presidency has taken a lead in this matter. The first machine for the extraction of the fibre was designed by Mr Proudlock, the curator of the Nilgiris. This machine is, however, not portable the fibre extracted is too short in comparison with the labour involved. The writer of this paper has placed upon the market an improved machine as the result of various researches and experiments; the working of this machine is said to be simple and the fibre extracted by it has won high class certificates. Mr Bannerjee gives an

estimate of the profits that this industry is likely to yield and those who are interested in this business, may write to the author direct for further information and guidance

Rai Saheb Panna Lal, one of our wellknown glass experts, writes on exhaustive paper on glass manufacture Mr Panna Lal rightly observes that a knowledge of the sources of raw materials, a leaven of skilled labour, manual labour-saving machines, technical literature and other facilities that we now possess ought to infuse us with hopes of a bright prospect for this industry After describing the several requisites of this industry, viz a sound management, technical training, sufficient capital, co-operation, chemicals, tools and other requisites for the success of Glass making, the writer enumerates the difficulties and also points out the following remedies for their removal,—

- (1) As India imports nearly twelve times more glass ware than she produces, there is ample scope for the expansion of this industry.
- (2) The ignorance of capitalists may be removed by a broadcast publication of the experience gained by the existing glass-makers, so that they may readily invest money in this industry.
- (3) A provincial Industrial Bank working with District Co-operative Societies may be established
- (4) To remedy the present inefficient management, existing glass factories may be approached, to allow the training of educated youngmen as managers, foremen of works and intelligent labourers
- (5) Workmen of the Minhar and other hereditary classes should be trained in the methods.
- (6) Automatic blowing machines and Presses being expensive, may be provided by the Local industries Department direct or through the agency of the Local Co-operative Stores
- (7) Establishment of Industrial Stores to stock and sell raw materials and ordinary tools for the benefit of small manufacturers.

- (8) The railway rates should be re-adjusted so that an inland factory may be able to compete with foreign imports
- (9) The Government and the Railways should patronize Indian Glass
- (10) The selection of a proper site for the factory
- (11) Use of a Trade Mark is also essential, though this fact is not recognized by Indian manufacturers.

“The possibilities of the perfume industry” have been dealt with by Mr. J. P. Srivastava, Technological Chemist of Cawnpore, aromatic seeds, roots, and other odorous substances are yearly exported from India in large quantities to be ultimately transformed into costly perfumes, yet no systematic attempt has yet been made to build up the Perfume industry. The result of this apathy is that even the perfumers of Kanauj had largely given up perfume making from flowers, as they found it more convenient to make them by thinning down the concentrated essences which they so long got from Germany. After alluding to the different processes of perfume manufacture, the writer suggests the inauguration of a factory at Kanauj, as it is the most suitable place for this industry.

“The importance of modern inventions and discoveries” is the theme of the paper of Mr. N. M. Sant, Electrical Engineer, of Bombay. Mr. Sant pays a just tribute of praise to the wonderful genius of mechanists and inventors of the last century for their exemplary patience and perseverance “under the most trying circumstances, amid obloquy and persecution.” These early pioneers have changed the very aspect of modern civilization. There is hardly any domain of human activity, which has not been affected and transformed by these inventions. In support of this statement, the writer has given a brief description of the changes which have been introduced in agriculture, medicine, surgery, chemical problems and researches &c. Gas, oil, water, hot air and electricity are now competing with steam. Electricity has especially made a very rapid and wonderful progress and is already used for manifold domestic work.

Nearly all important industries are affected by the present shortage of coaltar dyes and a contribution on this subject by Lala Babulal Govila, was quite opportune. The first successful

attempt to manufacture a dye from coaltar was made by an Englishman in 1856. Since then the industry having undergone a period of expansion in France and England went over ultimately to Germany, which was able to establish its superiority in dye manufacture owing to its extensive and systematic researches in this branch of activity. From the figures given by Mr. Govila, it appears that Germany had the largest number of factories for the production of dyes on a huge scale. He regrets that in India, no serious attempt has as yet been made in this direction, although there is a large and continuous market in the country itself for dye of all sorts as we are one of the most important dye consuming countries of the world. Owing to the ease with which coaltar dyes can be used, they are being largely utilized by the Indian dyers, in place of the vegetable dye-stuffs.

In the opinion of this writer, we "are in a position to manufacture sulphide dyes out of indigenous products, even if for some time to come we are not equipped with the facilities for the isolation of coaltar products." He also points out that India produces vast coal deposits, which can ensure a permanent and illimitable supply of tar and Benzol. Our gas works are capable of giving us a fairly good quantity of tar especially the coke ovens of the collieries of the Tata Iron works are likely to yield a steady supply of tar in large quantities. It is estimated that one ton of coal yields one pound of dye and thus India's total demand for dyes can be supplied by 20 million tons of coal raised from her mines.

Mr. Govilla concludes thus —

"The present one is the most favourable opportunity for this country to seriously tackle this important industry. Let us not be daunted by the idea that if we cannot at once start a factory on a huge scale entailing the outlay of crores of rupees, we have no chance of success. Alike in the best interests of the Government of this country, and the economic interests of the people, the question of producing coal-tar dyes in India deserves most serious consideration."

"The present position of the Indian Chemical Industries" has been delineated by Professor N. N. Godbole of the Dayal Singh College, Lahore, in his paper. At the very outset, Mr. Godbole, cites a few examples to show the abnormal rise in the prices of chemicals used for Photography, match and a host of chemical and manufacturing industries, including glass and textile concerns.

which are hard hit by the war. For the success of chemical industries in the country, we must first direct our attention to the manufacture of sulphuric acid, as this acid is the mother of all industries and its production is the starting point of most of the chemicals researches. We have in our country hardly 5 or 6 concerns to manufacture this acid, and these also are not working on a sufficiently large scale. There are two processes of manufacturing this acid, one is by the chamber process and the other contract process. The secrets of the industry have not yet travelled beyond the Rhine, each factory trying to keep them to itself.

The manufacture of superphosphate of lime and other manures, and a host of other industries depend on the cheap supply of sulphuric acid. The manufacture of alkalies, such as soda carbonate, caustic soda claim our equal attention, as they are the chief requisites of glass, soap, paper, bleaching and dyeing industries. Mr. G. N. Potdar's efforts in this direction deserve to be encouraged. There is also much scope for the manufacture of starch from maize, wheat or potato.

Coaltar colors, and synthetic dyes are next dealt with by Mr. Godbole. Soap and candle making, varnish and paint manufacture, essential oils, sugar, and tanning industries and pharmaceutical preparations have also been discussed.

The third paper in this group comes from Dr. Harischandra, the Director of the Chemical Research Laboratory, Dehra Dun on "The Value of Research". Dr. Harischandra being a foreign returned Chemical expert, is naturally well qualified to deal with this subject. He shows that we import annually on an average Chemical products,

Quantity (Tons)	Value
154,500	Rs 440,98,000

which are prepared out of 1,53,600 tons of raw material worth Rs. 245,1600 only

The sudden stoppage of Chemicals from Germany has given us an excellent opportunity to develop our chemical industries. In his opinion, the failure of this industry was due in the past to the following causes.—

- (a) Want of honesty, on the part of the managing staff, and inefficiency of the experts employed.

- (b) Owing to the fact that machinery and some times even experts had to be imported from foreign countries, the article produced, became naturally more expensive and could not compete with foreign supplies
- (3) The machinery manufactured in Europe is adapted specially to the requirements of that climate and needs therefore alterations to suit Indian climate.
- (4) We must manufacture chemicals from indigenous raw material and if possible with the aid of Indian made machinery

In the course of his paper, Mr. Harischandra discusses the following aspects of the question —

- (a) the value of scientific and industrial research, with a list of important raw materials and the corresponding chemical industries in which they are used.
- (b) the utilization of waste products.
- (c) The importance of chemical analysis for manufacturers and Businessmen.
- (d) Need of consultation with and the advice of chemical experts.

We now proceed to the next paper which treats of the "First three essentials of industrial development" contributed by Mr S. Gill, a certificated auditor from Lucknow According to Mr Gill, the following things are required for success in business .—

- (a) Capital
- (b) Business ability
- (c) Skilled labour

In regard to labour, Mr. Gill justly points out that Indian labour is far inferior in efficiency to the labour in England It is estimated that a Lancashire weaver produces in 7 or 8 hours two and half times the output of a Bombay millhand in 12 or 13 hours

To increase the efficiency of the students taking the University Art Course, he suggests that the training of the undergraduates of our Universities should be so ordered that our youths may obtain from such courses an education that will fit them for an active business life. There is need for two distinct schemes of education, one should be technical and the other purely managerial.

The author concludes with the following words of Mr A. H Silver —

"Let Education (Business Education) be regarded as the handmaid of industry, a means to an end, rather than an end in itself I refuse to believe that energy and perseverance are lacking in India They merely require directing into right channels and the earnest attention, which you, gentlemen, are now bestowing upon the subject, will I am confident, eventually bear fruit in the shape of a revival of industry in our midst"

Mr N S Upasani, a graduate in Chemistry sends a note on the improvement of the indigenous oil industry in the Bombay Presidency Being an expert in oil industry, Mr Upasani seems to be qualified to write on the subject that he has chosen The Bombay Government had specially appointed Mr Y G Pandit, the oil expert to survey and report on the condition of this industry in the Bombay Presidency Mr Upasani calls the attention of his countrymen to the fact, that no action appears to have been taken by the Bombay Government to give practical effect to the suggestions made in that report

At the Lucknow session, Seven Resolutions in all were passed. The first and second place on record the sense of sorrow of the Conference at the deaths of Hon'ble Munshi Prag Narain Bhargava and Mr G Subramania Iyer respectively The third recommends that the management of Indian Railways should be taken over by the Government in the interest of India The fourth appointed a committee to draw up a memorandum to be submitted to the Indian Industrial Commission The fifth, which is an omnibus resolution reaffirms 10 Resolutions on important questions which were passed at the Bombay session held in 1915. The sixth Resolution deals with the question of the drawing up of a constitution for the Industrial Conference By the Seventh Resolution, the office of the Conference which was located at Amraoti was transferred to Bombay, the Hon Joint Secretaries being the Hon'ble Rao Bahadur Mudholkar and the Hon'ble Mr Manmohandas Ramji with Mr J K. Mehta as the Hony Asst. Secretary

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# SUMMARY OF PROPOSALS AND SUGGESTIONS.

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## A.—The Work of the Conference.

1. It is no good to ask for a few papers once a year, on different subjects, but the time has come, when the Conference should take up the task in right earnest and should set apart at least 10,000 rupees for the study of the sugar industry. If this Industry can be saved, it can be saved now or never. The practical work should be done by the Conference and it should show that at least in Agricultural industries India can hold its own. (*Babu Multar Singh*, p. 57 )

2 Captains of industry and all who attend future Conferences and Congresses, which include the Swadeshi Resolution in their programme, should set an example to their countrymen by appearing in a dress composed entirely of Swadeshi manufacture (*Mr M. B. Sant*, p 68 ).

## B—Agriculture.

3 I would suggest the following reforms:—(1) Uniform system of land tenures, (2) a practical scheme of small proprietary holdings, say of five acres each, (3) an amended fiscal system safeguarding the true interests of Indian agriculture and industries against the desolating hand of foreign rivals, (4) consistent State encouragement of general agriculture, private philanthropy co operating with the Government in providing the necessary capital, machinery and organisation towards the exploitation of the immense natural resources of India, (5) a revision of the present system of public education so as to bring it in line with the methods pursued in Europe and America to meet the agricultural and industrial needs of the people (*Mr Keshavlal Oza*. p 3).

4. The Government should encourage agriculture by providing technical instruction in dairy-farming, as in Canada, and by arranging with the railway authorities to keep down the cost of transit,



and to construct further lines in the way most likely to suit agricultural transport, as in Denmark (*Ibid*, p. 12. )

5 When farming operations are slack, we should provide social and intellectual amenities to the farmers in the form of lectures, with or without lantern illustrations, bringing out the importance of the hygiene, sanitation and domestic economy in the daily life of the farm. (*Ibid*, p. 14 )

### C—Sugar Industry.

6. Modern Sugar refining methods with scientific gur making ought to be substituted for the old ones for the present, but I must repeat that in the long run, gur refining will have to be given up. (*Mr R R Sanghi*, p. 33).

7 If the production of rāb be thought to be very difficult, then the quality of gur should be improved (*Babu Muktar Singh*, p 56).

### D—Capital and Co-operative Credit.

8 There should be established either one State Bank for the whole of India with branches and sub-offices in all important centres or a State Bank for each Province (*Presidential address of Hon'ble Roy Sita Nath Roy Bahadur*, p 23 )

9. The State Bank may lend money either through its own industrial department or through state aided industrial banks, which may be started as accessories or adjuncts to the State Bank (*Ibid*).

10. It would certainly be to the best interests of the country to have the use of foreign capital. (*Ibid*).

11 The industries connected with horticulture, floriculture, forestry, and pastoral, dairy and poultry farming can be turned to glorious gain, by promoting co-operative purchase, co-operative production and co-operative stores. (*Mr Keshavalal Oza*, p 11).

12 Agriculture is the first thing which should claim the attention of Co-operators in India (*Babu Shivcharan Lal*, p 73).

### E—Education.

13 For the training of labour, schools should be started in suitable centres in every district for imparting industrial education

of the primary sort, the chief object of which would be to improve the efficiency of the average labourer so that he may turn out better and more work and get a better return for his labour. But a system of elementary general education must precede industrial education (*Presidential address of the Hon'ble Rai Sitanath Roy Bahadur*).

14. Every province ought, in my opinion, to have a Technical College for the training of industrial experts and of supervisors and foremen. The course of study should include all industrial subjects suited to the province concerned, including agriculture, electrical and mechanical engineering, and mining. (*Ibid*)

15. At least one fully-equipped Technological Institute should be established for teaching the higher branches of industrial science. The Technological Institute and the Technical Colleges may be affiliated with the Universities and on their research side, they may work in co-operation with the Tata Research Institute and other science institutions (*Ibid*).

16. Arrangements ought also to be made for the applied training of the students in mills and factories (*Ibid*)

17. When students have passed out of the Institute, the best among them may be sent abroad with scholarships to finish their education in the industrially advanced countries, where they might be afforded opportunities for studying the most up-to-date processes and methods of industrial work. (*Ibid*)

18. The India office which purchases huge quantities of stores from British factories and the Indian Government ought to insist on the admission of Indian apprentices into railway and other workshops and English Factories (*Ibid*)

19. For the proper training of captains of industry, commercial education is essential. The would-be captain should, besides acquiring a general knowledge of economic science, make a serious study of the special problems which arise in this country regarding the production, distribution, and exchange of commodities. The course of instruction ought to include subjects like commercial law and history, banking methods, import and export problems, exchange rates, transport, freight, and insurance, company management, and the conditions of markets (*Ibid*)

20 Commercial instruction is also necessary for those who are to occupy the positions of superintendents, auditors, and accountants, and even for men who are destined for the humbler positions in the commercial line. The best agency for imparting commercial education of the higher type is, the University (*Ibid*).

21 I Suggest—

- (1) That training schools be established to teach young men and women three things—the laws and practice of health, habits of gentleness and justice, and the trade or calling by which they are to live.
- (2) That the Government should establish farms and workshops for the production of all necessities of life, where only good and honest work shall be tolerated and where a standard of work and wages shall be maintained.
- (3) That any person out of employment shall be received at the nearest Government School. If ignorant, he shall be educated, and if competent to do any work, he shall have the opportunity to do it.
- (4) That comfortable homes be provided for the sick and for the aged, and that this be done in justice, not in charity (*Mr. Keshavlal Oza*, p 16 )

22. India wants the Government and enlightened philanthropy to multiply Institutes of Technology with special departments for mining and metallurgy, naval architecture and marine engineering, railway engineering and hydraulics, electric traction and power transmission, electro-chemistry, optics and various branches of chemical technology and applications of Biology. (*Ibid* p. 27 )

23 Education should be given a much more practical aspect, coming more into touch with the actual world and less of a theory, with examinations as its sole aim. Practical science, practical drawing, practical thinking, practical educational handwork in school on the principles recognized in all modern schools in Europe and America, to produce practical thinkers, is the solution to the educational question (*Mr. H E Kinnis*, p 60).

24. For the higher training in specific practical branches of Industry, the establishment of Minor Technical schools as

feeders to the Central Technical schools would serve an excellent purpose. In these minor technical schools even more practical training could be provided, fitting the students to take up industrial pursuits with a brain trained to assimilate the elements necessary for the success of an industrial or business concern. (*Ibid*).

25. Technical schools specializing in the teaching of subjects or group of subjects specifically suited to the needs of existing or possible industries, should be started for the solution of the labour question (*Ibid*).

26. Demonstration or special sections should be attached to Central Technical schools for providing instruction in specific trades (*Ibid*).

27. Selected candidates could be nominated by District or Municipal Boards from the districts offering facilities for the opening up of these industries. These students on completion of their course of training would be in a position to take up employment in workshops, or to act as teachers and supervisors in workshops, opened for the establishment or improvement of these industries (*Ibid*).

28. In the case of minor industries, such as toy-making, samples of foreign manufactures from which similar patterns could be made and supplied as models would be available at the central schools (*Ibid*).

29. By exhibiting manufactures in exhibitions at large centres, these goods would be advertised and markets found for such products (*Ibid*).

30. Government might assist in the development of the minor pioneer industries, by granting advances to such concerns on security, or by supplying plant on the hire purchase system, to selected applicants who had completed a satisfactory course of training in a recognised institution and are in a position to give security for such Government assistance (*Ibid*).

31. The supply of timber at nominal rates during the initial stages would materially assist in the establishment of the wood-working industries. In the matter of the supply of raw timber, failing private agencies taking up the business, the forest department might place the timber products of the forest on the market in a state in which the large and small buyer could equally share (*Ibid* p. 60 & 61).

## F—Irrigation.

32 Where even water carriage is very economical the construction and improvement of waterways ought to engage the serious attention of Government. (*Presidential address of the Hon'ble Rai Sita Nath Roy Bahadur* ).

## G—Railway Management.

33 The management of Railways should be taken over by Government. Another way of solving the problem would be to appoint a permanent Commission on the lines of the Railway and Canal Commission of England. (*Presidential address of the Hon'ble Rai Sita Nath Roy Bahadur* ).

## H—Railway Rates.

34. Our economists should make a special study of the Railway Rates and make the Government realize that we consider the anomalous treatment to be as unjust as it is wrong. (*The late Rai Bahadur Munshi Prag Narain Bhargava* )

## I—Labour.

35 It is necessary, for the industrial development of the country to secure the mobility of labour by removing the social prejudices of the labouring classes, by cheapening the railway fares, and by making the conditions of work in the factories more attractive (*Presidential address of Hon'ble Rai Sita Nath Roy Bahadur* )

36. The problem of unemployment can be simplified by the Government (1) devising some means (afforestation, labour colonies, etc.,) for the absorption and utilisation of surplus labour, (2) encouraging the formation of municipal labour bureaus to relax the tension between capital and labour, of industrial partnership of employer and employed resting, not on the mutable basis of mere salaries and wages, but on the solid bedrock of the profits on capital, of Joint responsibility and management and of apprenticeship societies to enable the worker to acquire an all-round training in his prospective occupation by means of financial aid during his novitiate, and (3) pressing the scientific manager, the psychologist and the bio-psychologist into the service of industry. (*Mr. Keshavlal Oza, p. 15*).

## J—Fiscal Policy.

37 The Government should help our industries by financial assistance, expert advice, wide diffusion of secular, technical and industrial education, internally, and by imposing prohibitive duties on foreign articles which can be manufactured in India, externally (*The Late Munshi Prag Narayan Bhargava*).

## K—Insurance.

38 Insurance agents should work for any indigenous insurance company or companies that may be started Rs 50 or 60 lakhs, for starting a few insurance companies should be forth-coming To do business on a large scale, these companies to be started anew should sometimes join the Tariff combination for the purposes of re-insuring and reducing their risk (*W T Halal*, p 78 )

39. Fire Insurance companies should with competent men open their branches in other important centres, and all such concerns and companies be controlled by a general board of competent financiers and experts (*Ibid* )

## L—Government Help.

40. Government Banks ought to grant loans to industrialists on easy terms—whenever proper security is offered and to provide for transport facilities. (*Rai S. Nath Bahadur* )

41 One suitable form of Government aid would be to guarantee a reasonable rate of dividend; when the concern appears to be a perfectly sound one. (*Ibid* )

42 Bounties and subsidies would be much appreciated in the first stage of a new industry or in the case of a struggling industry, especially where the industry has to contend against the unfair competition of a bounty-fed or subsidised foreign industry. (*Ibid* ).

43. Demonstration and pioneer factories will be very useful as object lessons and will serve as incentives to private enterprises (*Ibid* )

44 When the success of such factories has been established beyond doubt, they should be handed over Joint-Stock companies, unless the industries are necessary for government purposes or are of public utility (*Ibid* ).

45. Government ought always to give encouragement to local industries by undertaking to purchase their products, whenever the articles are of a passable quality and the prices are not too high. (*Ibid*).

46 It is necessary to insist in this connection on the reduction in size of the Stores Department of the India Office in London. (*Ibid*)

47 Every province ought to have its Department of Industries with an expert Director at its head assisted by a competent Board consisting of officials and non-officials. (*Ibid*)

48 Government aid is needed for enabling struggling Industries to stand on their own legs and for the establishment of new industries. (*Ibid*)

### M—Miscellaneous.

#### Wood working.

49 The exploitation of Indian timbers presents many commercial possibilities, which should provide a source of profitable employment for Indian labour and capital. (*Mr. H. E. Kinns*, p 58)

50 The developement of cane and bamboo furniture making, could be effected. (*Ibid*)

51. Large quantities of wooden toys and turnery, might, very well be made in India. This could be made essentially a village industry (*Ibid*)

#### Swadeshi movement

52 The following measures should be adopted for the purpose of creating a market for indigenous products at home and in foreign countries :—

- (a) For home market, shops should be opened in all important centres and in every town for the collection and sale of only countrymade articles
- (b) There ought to be standing exhibitions of indigenous goods and productions of art at least in the principal cities of India.
- (c) It is necessary also to collect specimens of foreign goods of various description which should be kept on view for the instruction of artisans and others desirous of studying them for the purpose of producing similar wares.

- (d) Determination on the part of the people to buy genuine Swadeshi articles in preference to foreign goods, even if the cost is slightly higher
- (e) To organise exhibitions of machinery large and small which is actually used in foreign countries for the manufacture of different articles of daily use  
(*Mr. M B Sant*, p. 66 )

53. Captains of industry and all who attend future Conferences and Congresses, which include the Swadeshi in their programme should set an example to their countrymen by appearing in dress composed entirely of Swadeshi manufactures (*Ibid*, p 68. )

### Paper making

54 To produce paper of the quality we use to-day. We must manufacture chemicals in India (*Mr. Ahmed Hasan* p 100.)

55 To meet the demands for paper at a relatively cheap rate in the face of foreign competition, we should adopt the following measures.—

1. Big factories should be established to turn out machines, Boilers, Fly Wheels, Felts and other accessories, now imported from Europe.

2. It is imperative for mining experts to survey and explore possible coal fields in the United Provinces, the Punjab and other provinces yet untouched

3. Special concession rates of Railway freight on articles largely consumed by them, should always be fixed for different Industries, Factories or Mills without any favour or distinction and the free time hitherto allowed for loading and shunting back empties to the station should be extended.

4. The whole requirement of Government should be drawn from the Indian made papers which may be purchased in equal proportion from all the mills, or the proportions should be distributed provincially, the rates to be fixed in accordance with the substance, finish and durability as well as the amount of expenditure incurred in the paper making materials.



5. A combine among all the Indian paper mills is absolutely necessary to stop unhealthy competition leading to the most ruinous consequences.

6 There should be a number of technical schools to teach subjects bearing on paper-making, as well as schools for educating labouring classes. (*Mr. H D Singh*, p 105-107)

### Plantain fibre.

56. Persons of limited means may make a trial of extracting plantain fibre after purchasing a sample machine. The work of exportation may be entrusted to any of the numerous agencies in all presidency towns. (*Mr. J. W. Banerjee* p. 108 ).

### Glass making.

57. The old *Minhar* class may be helped to work in their cottages by co-operative societies with loans and by Government experts with technical guidance in the erection of effective furnaces and with the supply of modern tools on payment They may further be assisted to dispose of their glassware by the provision of sales organisations, consisting of wholesale buyers incorporated into industrial stores These stores may also stock and sell raw materials and tools to these men. (*Rai Sahib Raman Lal* p 120.)

58 The Government may further help cottage workers by securing to them special maundage freights for the carriage of coal, sand, soda, fireclay and the outturn of glassware on the Indian railways (*Ibid* ).

59. Factories may engage surplus workmen not absorbed in cottage industries, and train more suitable workmen from other classes in such numbers as may not prove burdensome to them. (*Ibid* ).

60. Factories may be assisted by the Local Governments which may supply labour-saving contrivances, like blowing machines and presses, on the hire-purchase system on easy terms (*Ibid* )

### Perfume industry

61 The perfume industry is one which is capable of great expansion and improvement The inauguration of the proposed factory at Kanauj will be a very interesting experiment which is fraught with immense possibilities (*Mr J P Sivastava* p 141 ),

## Trained Students.

62. I would, exhort my wealthy countrymen and especially the capitalists of Bombay and other prominent cities to throw open their factories to technically trained young men for completing their practical training and also to provide them with a decent livelihood, by utilizing their services in existing concerns and also for starting new ones. In the selection of men, there should be the consideration of efficiency alone and no class prejudice or predilection ought to come in the way (*Mr N M. Sant*, p 146)

63. Serious attempt should be made with regard to the manufacture of dyes. (*Lala Babulal Govila*, p 147)

64. Encouragement should be given to research work for the manufacture of dyes. Means should be devised to introduce improved ovens for converting coal into coke, so that we may derive not only valuable coal-tar supplies as a by-product which at present goes to waste, but also Ammonia liquor which can be of great use in the preparation of manures for agricultural purposes (*Ibid*, p 154)

65. We must start manufacturing the fundamental products from Indigenous raw material and as far as possible from Indian made machinery. (*Dr Harischandra*, p 172.)

66. While a technical and engineering school is required to fit a man to work in the factories, there exists a far greater need for a college to turn out men competent to direct the working of the factory, prepare cash accounts, classify goods, fix prices, push on sales, find markets, watch financial fluctuations, recognise coming prosperity, be able to grasp questions of labour, and arrange the relations of employers and employees, understand the duties as well as the privileges of joint-stock companies, and with a mind to devise and carry out great financial operations. (*Mr. S Gill* p. 183.)

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# RESOLUTIONS

PASSED AT

## The Twelfth Session of the Indian Industrial Conference

HELD AT LUCKNOW

*On 30th December 1916.*

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### RESOLUTION No I

That this conference records its profound sorrow at the death of the late Hon'ble Munshi Prag Narain Bhargava, Chairman of this year's Reception Committee of the Conference, in whom the United Provinces have lost a leading industrialist and a great sympathiser with the industrial development of the country

### RESOLUTION No II

That this conference expresses its deep sorrow also at the death of Mr. G. Subramania Iyer, who was a great champion of the industrial development of the country, and who had done much in his lifetime to promote this cause by his work for the National Fund and Industrial Association of Madras

### RESOLUTION No. III.

#### STATE MANAGEMENT OF RAILWAYS.

That this Conference is of opinion that in the interests of the country, it is essential that the management of the Railways, not at present managed by the state, be taken over by it as opportunity occurs.

### RESOLUTION No. IV

#### INDUSTRIAL COMMISSION.

That a committee of the following gentlemen be appointed to draw up a Memorandum dealing with the questions referred to the

Indian Industrial Commission, which should be circulated to the Standing Committee of the Conference and finally submitted to the next Session of the Conference for adoption —

President — The Hon'ble Rai Sitanath Roy Bahadur

Members — (1) The Hon'ble Mr Manmohandas Ramji

(2) Sir Vithaldas D Thakersey, Kt

(3) Hon'ble Rao Bahadur R N Mudholkar

(4) Mr Vidya Sagar Pandya

Secretaries — Mr J K Mehta.

### OMNIBUS RESOLUTION No V

That this conference reaffirms Resolutions Nos 3, 4, 5, 6 7, 8, 9, 10, 11 and 13 passed at the last session of the Indian Industrial Conference held at Bombay in December 1915

#### *Resolution No 3*

#### TECHNICAL AND INDUSTRIAL EDUCATION

- (a) Having regard to the fact that the progress and prosperity of every nation depends in these times on Industrial and Technical Education, this Conference earnestly recommends the establishment of a Technological faculty at the principal Indian Universities, the development of Technical Institutions already existing and the opening of new ones and the gradual introduction of technical instruction in primary and secondary schools
- (b) Recognising that no system of Industrial and Technological Education, however developed it may be, can be successful without a sufficient encouragement being given to persons who have received such education, this Conference appeals to men of capital and industry to help young Indians, technically trained, in finding practical work and employment

#### *Resolution No. 4.*

#### DEVELOPMENT OF INDIAN INDUSTRIES

This Conference desires to place on record its opinion that for the wellbeing of India, it is the duty both of Government and the

public to stimulate the old and foster new industries, and while appreciating all that has been done by the Imperial and Provincial Governments in this direction, recommends for the same the following measures —

- (a) that fiscal autonomy should be granted to India in regard to the levying of duties, both on imports and exports,
- (b) that where the Departments of Industries do exist, they should be so organised as to effectively assist in the creation and development of industries, and in the Presidencies and Provinces, where they do not exist, they should be established, and that Industrial Advisory Boards be constituted in each province
- (c) that Industrial surveys should be taken of industries possible to be developed in the country.

*Resolution No. 5.*

EXCISE DUTY.

This Conference earnestly urges the repeal of the Excise Duty on cotton goods, which is an inequitable tax and considers it very desirable in the interests of Indian Industries that countervailing duties should be levied on bounty-fed and subsidised goods from foreign countries, when they compete to the injury of indigenous industries.

*Resolution No. 6*

FAVOURLED NATION TREATMENT

This Conference trusts that in any treaties which may be arranged between the different International powers hereafter, the Imperial Government will arrange that so far as Indian fiscal interests are concerned, India shall be allowed a voice through her own representatives in the settlement and that, at any rate, she shall be accorded the most-favoured-nation treatment

*Resolution No. 7.*

INDENTURED LABOUR.

This Conference tenders its respectful thanks to H E Lord Hardinge, Viceroy, and Government of India, for having recommended the abolition of the system of indentured labour to the Rt.

Hon'ble the Secretary of State for India, and in view of its highly injurious and immoral effects, urges that the system be abolished as soon as possible

*Resolution No. 8*

INDIAN STUDENTS ABROAD

While recognising the efforts made by the Secretary of State for India for the better training of Indian technical students in the United Kingdom and on the Continent, this Conference strongly recommends that he should, in placing orders for the Government of India, give preferences to such firms, other things being equal, which offer facilities to Indian students for practical training.

*Resolution No. 9*

BRITISH CONSULAR SERVICE AND INDIA.

This Conference is of opinion that Indian commercial attaches should be appointed to principal British Consulates to look after Indian commercial interests, and that standing Museums of Indian products should be maintained at these consulates and also at London. The Conference welcomes the creation of the post of Trades Commissioner for India in London and hopes that it will be a permanent one held by persons, preferably Indian, fully conversant with Indian Commercial and Industrial conditions.

*Resolution No 10*

PURCHASE OF STORES

This Conference earnestly urges the Government to purchase all their requirements as far as practicable from this country and to put their Resolution of 1909 regarding the same more and more into effect.

*Resolution No 11*

COTTAGE INDUSTRIES

This Conference is of opinion that it is in the interests of the progress and well-being of the country that efforts should be made both by Government and the public for the starting and reviving of various minor and cottage industries.

*Resolution No. 13*

## INDUSTRIAL BANKS.

This Conference is of opinion that as systematic development of industries cannot be carried on without sound financial aid and proper guidance, it is necessary to make effort for the establishment of Industrial Banks, similar to those found in foreign countries.

## RESOLUTION No VI.

## CONSTITUTION OF THE CONFERENCE

That in regard to the constitution of the Conference, a draft Constitution be drawn up and circulated among the members of the Constitution Committees of 1915 and 1916 and that the opinions of the members be invited thereon by the 31st March 1917 and the final draft and report be published not later than the 30th September 1917.

## RESOLUTION No. VII.

## APPOINTMENT OF OFFICE-BEARERS

- (a) That the following gentlemen do constitute the Standing Committee of the Indian Industrial Conference for the year 1917 to advise the Secretaries on all matters and to carry on the work of the Conference
- (b) That the Hon'ble Rao Bahadur R. N. Mudholkar, C. I. E. and the Hon'ble Mr Manmohandas Ramji be appointed Honorary Joint Secretaries of the Indian Industrial Conference for the year 1917 and Mr J. K. Mehta, M. A., Honorary Assistant Secretary, and this Conference authorises the Secretaries to appeal to the public for a sum of Rs 8,000/- required to carry on the work of the Conference.
- (c) That the office of the Conference be located in Bombay.

## MEMBERS OF THE COMMITTEE

1. The Hon'ble Rao Bahadur R. N. Mudholkar, C. I. E.,  
(Amraoti)



- 2 The Hon'ble Mr Manmohandas Ramji, (Bombay)
- 3 Hon'ble Mr. Lalubhai Samaldas, do
- 4 Sir Ibrahim Rahimtulla Kt do
- 5 Hon'ble Sir Fazulbhoy Currimbhoy, Kt. do.
- 6 Sir Vithaldas D Thackersey, Kt do.
- 7 Dewan Bahadur Govinddas Chaturbhujdas, (Madras)
- 8 Mr C Gopal Menon, do
- 9 Lala Harkishen Lal, (Lahore)
- 10 The Hon'ble Mr O Y Chintamani, (Allahabad)
- 11 The Hon'ble Pandit Madan Mohan Malaviya, do
- 12 Babu Vikramjit Singh, Secretary Indian Chamber of  
Commerce, U. P.
- 13 The Hon'ble Rai Sitanath Roy Bahadur, (Calcutta)
- 14 Sir R N Mukerjee, K. C. I. E., do
- 15 Mr S. P Bose, do
- 16 The Hon'ble Mr M B Dadabhoy, C I E, (Nagpur)
- 17 The Hon'ble Rai Purnendu Narain Singh Bahadur  
(Bankipur)
- 18 The Hon'ble Mr Mazhar-ul-Haque, (Bankipur)
- 19 Rao Bahadur Hiranand Khemsing, (Sind)

SITA NATH ROY

*President,*

The Twelfth Indian Industrial Conference

R N MUDHOLKAR

MANMOHANDAS RAMJI

*Joint Secretaries,*

Indian Industrial Conference,

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PROCEEDINGS  
OF THE  
Twelfth Indian Industrial Conference  
HELD AT LUCKNOW

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*On Saturday, 30th December 1916.*

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The Twelfth Session of the Indian Industrial Conference was held at Lucknow in the Congress pavilion at 2 P M The Hon'ble Rai Sitanath Roy Bahadur, the President-elect of the Conference, was received by the Hon'ble Rao Bahadur R N Mudholkar, the General Secretary of the Conference, the members of the Reception Committee headed by their Chairman, the Hon'ble Pandit Gokarnanath Misra and conducted to his seat on the platform

WELCOME ADDRESS.

The Hon Pandit Gokarnanath Misra, in welcoming the President-elect and delegates to the Conference said :—

Gentlemen,—It is my most painful duty to bring to your notice the death of the Chairman of the Reception Committee of the Indian Industrial Conference, which melancholy event took place only six days before the sitting of this Conference This year, we have been most unfortunate, so far as our Chairmen of Reception Committees are concerned The Indian National Congress lost its Chairman five weeks before the sitting of the Congress, and so far as the Indian Industrial Conference is concerned, we lost the Chairman of the Reception Committee only six days ago. However, under extreme necessity, I have consented to occupy the place which would have been so worthily filled by my late friend, the Hon'ble Munshi Prag Narain Bhargava You know that in his death, we have lost a man who used to take a deep interest in the industrial welfare and advancement of our country He was connected with many industries and other concerns in the United Provinces. Every one who is a resident of Lucknow—not only of Lucknow

but of the United Provinces—knows what great interest he used to take in the Paper Mills of Lucknow. Were it not for the keen interest which he used to take in that company, you might have seen that concern brought under difficulties not long ago. He was also keenly interested in the pulp industry connected with the manufacture of paper. The zeal which he showed in those industries made the people of United Provinces elect him as the President of the Industrial Conference held last year at Gorakhpur, and it was in the fitness of things that he should have been elected Chairman of the Reception Committee of this year's Industrial Conference. The late Hon'ble Munshi Prag Narain Bhargava had written out his speech and got it printed in his life-time, and I take the liberty of reading it. But before doing so, on behalf of the Reception Committee, I wish to accord to you our most hearty welcome, and although in his absence, we have not been able to look to your comforts at all, I hope that under the circumstances in which we stand at the present moment, you will pardon us for our shortcomings and defects. I now begin to read to you the speech which had been written out by the late Munshi Prag Narain Bhargava.

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## Speech of the late Hon'ble Munshi Prag Narain Bhargava, Rai Bahadur.

RAI SITANATH ROY BAHADUR,

DELEGATES, LADIES AND GENTLEMEN,

From Bombay to Lucknow is a far cry One is the premier city of India, a city which boasts of its numerous merchant princes and Industrial kings, of its wealthy traders and enterprising pioneers of commerce, of imposing palaces and majestic hotels, of charming scenes and captivating sights and what not, the other cannot, even by courtesy, be designated as a commercial or an industrial town. Though we may lack in all these external magnificences, I assure you that we possess hearts as friendly, as loving and as warm as do the people of the capital of the Western Presidency where you met last year Then, I, as the mouth-piece of the people here, cannot personally stand any comparison with the veteran, Sir Dinshaw Petit, who welcomed you last year and whose record of service in field of commerce and industry is well-known but I request you to believe me that, though the words may not be able to expressively convey it, I, on behalf of myself, my committee and my province offer a most cordial welcome to you, one and all, who have come here from various distances in this trying weather of Upper India, to make the session of this conference worthy of the times, through which we are passing and worthy of the country which we so passionately love I pray that any defects and shortcomings that you may notice here in the provision of bare comforts and necessities of life (more we do not pretend to have been able to provide) may not be taken to mean want of will in us but are attributable to mere accident.

Gentlemen, as I have said, Lucknow is not a commercial or an industrial town in the modern sense of the word There are no cotton mills, no woollen mills, no jute mills here The only modern industry which it possesses is the Paper Industry, in which I myself am so much interested. But this does not imply that Lucknow is altogether devoid of industries or never had any before. Even now our manufactures, small though they are, cover an extensive

field, some of them having special importance of their own. The manufacture of cotton fabrics of all kinds from the coarsest cloth to the finest muslin still gives employment to a number of people, though this number is decreasing day by day. The muslin is usually employed as ground work for chikan embroidery and is preferred to the European article. Cotton printing is still a flourishing industry of Lucknow. The chintz and printed nankin are much appreciated and are considered to be superior to any similar European article. Much of the printing is now done on imported cloths and large quantities are exported to other markets. The most important industry connected with cotton is, however, the famous chikan work of Lucknow. This is embroidery done in silk and cotton on fine muslin. Articles of cambric so embroidered are still very popular with the wealthier classes of the people and are bought in large quantities by world tourists and other Europeans visiting Lucknow. The work affords employment to a large number of women and children of respectable families impoverished by the abolition of the Oudh Court. Lucknow has a name also for other forms of embroidery. The well-known Kamdani work is similar to chikan, but is done in gold and silver threads. Ivory carving, wood carving, pottery, clay modelling, manufacture of tobacco and perfumes are other arts and industries which deserve a mention. The Upper India Couper Paper Mills gives employment to over 600 persons a month.

In this year it manufactured about 3,000 tons, of paper which has been the record ever since its start in 1879. Some printing Presses, the oldest and the most important being the Newul Kishore Steam Printing Press established in 1858, and the Lucknow Iron Works started in 1893, both my own concerns. Ice Factories, Oil and Flour Mills are some other modern industries of Lucknow.

But if Lucknow is not noted for its trade and industries, certainly in historicity and in beauty it can claim an importance all its own. The *Shah* period is still in the recollection of many a resident of the town and the numerous gardens and palaces point to the enormous wealth and to the aesthetic taste of the Nawabs. The great Imambara which bears ample testimony to the solidity of the work of the older regime, the Dilkusha Palace built by Saadat Ali Khan as a hunting-box and country residence, the La Martiniere College with the lofty-fluted masonry column in its front,

the Kaisar Bagh palaces with the famous Baradari, the Chhatar Munzil palace now occupied by the United Service Club, the Residency, the Machchibhawan, the Rumi Daravaza supposed to be a facsimile of one of the gates of Constantinople, the Hussainabad Imambara or the palace of lights, the Badshah Bagh with its Canning College buildings of recent addition, the Moti Mahal palace, the Shah Najaf are some of the historic sites which you have seen or will see during the rest of your stay. Lucknow with all these and with other features of later times, offers its hearty welcome to you.

Gentlemen, the business of the Chairman of the Reception Committee being only to receive and welcome the guests I should properly stop here, but the practice has been otherwise I do not wish to follow that practice by inflicting a long speech on you, but I do wish to mention, merely as suggestions to this conference, a few facts in which I am personally interested or which, in my opinion, deserve chief consideration at our hands

Foremost among the subjects which are agitating the mind of the industrial and commercial community is, of course, the present war. It is needless for me to say, as it has been already said any number of times and nobody with a sound head over his shoulders has contradicted or dare contradict it that the commercial and industrial class as a body has stood loyally with the cause of the Allies and come what may, it means to stand by them in future. The war, there is no doubt, has affected commerce and industries of the world to a degree which it is hard to describe. Germany held a world monopoly, so to say, for certain classes of goods, the absence of which is so keenly felt now. There are other classes which Germany and other enemy countries supplied to the world at more favorable market rates, these have also disappeared and the problem in every country is how to replace them. America and Japan are busy in filling the gap throughout the world by their manufactures. What has India done or is doing? For some time we clamoured and clamoured, prayed the Government to help us, induced the people to take to industrial pursuits, but the result has been anything but satisfactory. There are causes the existence of which does not inspire hope in the Indian mind. The chief of them is the fiscal policy of the Government. I have said publicly before and repeat it now that it is my conviction that in a

country, the development of whose industrial resources has just begun, the policy of unrestricted Free Trade is most detrimental. All the important countries in the world have risen to their present industrial eminence by a well-organised system of State-aid and protection in the earlier stages. Why should India alone be an exception? Unless, therefore, the Government helps our industries by financial assistance, expert advice, wide diffusion of secular, technical and industrial education, internally, and by imposing prohibitive duties on foreign articles which can be manufactured in India, externally, I, for one, have no hope of seeing Indian Industries developing properly. Even Sir Thomas Holland's commission has been precluded by the Government in England from discussing the tariff problem. The reason is obvious, the Government in England is in this respect, as in many other respects, unable to go against the wishes of the people. Lancashire is stronger than the Cabinet. What is the remedy? Fiscal autonomy in India alone. Sir Valentine Chirol, (even he!), cannot "justify the refusal to India of the fiscal autonomy for which there is a far more widespread and general demand than for political autonomy." I hope this conference will urge on the Government to take immediate steps to get the fiscal policy modified to suit the conditions of India. And I dare say this is the most proper time to agitate for this change as the British statemanship has realized the danger of unrestricted free trade even in England and is on the eve of giving it up in favour of State-aid.

Gentlemen, I think you will expect a few words from me about the paper industry with which I have had a life-long connection. The Lucknow Paper Mill was started about 40 years ago and it has since carried on its existence now with greater, now with smaller activity during this period. This mill, like other Paper Mills in India whose number is not large, not more than 7 or 8, used to manufacture paper of rough descriptions before the war. The finer and superior qualities were imported from abroad, Germany and Austria being again the chief suppliers. These countries not only supplied manufactured paper but for some of the chemicals and dyes indispensable to the paper manufacturer, they had a sort of monopoly to such an extent that the rest of the world has not so far been able to place decent substitutes on the market. The natural sequel has been that supply of paper has fallen much short of the demand for it and the price has risen abnormally high. Even the United Kingdom has felt the

pinch of the situation. There, as everywhere else, this shortage of supply is visible in the absolute stoppage of a number of newspapers and periodicals, in the raising of prices in others and in the reduction of volume and size of still others. In India, the paper mills in spite of working day and night cannot cope with the demand. As this industry is no new thing in India, one may reasonably question, why not multiply mills? But, first, the difficulty of getting chemicals and dyes is in our way. Then it is so very difficult to obtain suitable machinery. The result is that, with the help of the materials available, we can only make a limited quantity of unbleached and uncoloured paper. This conference, I am confident, will urge upon the Government the advisability of introducing the manufacture of chemicals and other such materials in this country at an early date, so that the paper industry, for whose development, this is a unique opportunity, may expand.

Closely connected with the paper is the Pulp Manufacturing Industry. In fact, it is only a subsidiary industry. At present our paper factories either import grass from distances and convert it into paper in their own mills or they have to import pulp from abroad. The pulp imported from abroad, not only proves costly, but is available in limited quantities also with the result that our paper manufacture is lost in competition with more favourably situated countries. But this industry is one of those, which have no insurmountable difficulties in the way of their development. Grass suitable for pulp making is available in plenty in this country and no expert training is needed to make it into pulp.

A company has been recently started at Lucknow for undertaking the manufacture of this material. We, I say we, because I am again personally concerned in the success of this industry, floated this company and were able to secure the co-operation of the leading capitalists of these provinces and outside and the sympathy of the local Government as well. A promising number of shares was subscribed and had not the war broken out, this industry would have been fairly established by now. Owing to the difficulties in the importation of suitable machinery, capital became shy. But we are taking necessary steps to surmount this difficulty, and God willing, we hope to succeed in its establishment ere long. The project is to establish a factory of Tulshipur in the midst of the grass forests to convert grass into pulp on the spot. This will



mean the elimination *in situ* of the freight and handling charges on the 60 per cent of waste which grass contains. This will reduce the cost of manufacturing paper proportionately and thus competition with imported paper will become less keen. Gentlemen, manufacture of pulp is the coming industry of India, and as difficulties in the way of its success are comparatively few, I doubt not, it bids fair to become one of the most lucrative industries after, if not during the course of the war.

The sugar industry, the Glass industry, the Aluminium industry, the Oil-seed industry, and many others are such as should claim the greatest attention of my countrymen who are desirous to see India prospering industrially and I am sure they will receive deserving notice of this conference.

One factor which is a great obstacle in the way of our industries is the problem of Railway freights. If I may be allowed to speak freely and frankly on this subject, I will have no hesitation in saying that the freights in India are such as do not encourage our trade and industries. On the contrary, they provide facilities to the European traders and encourage foreign industries. Any number of instances can be cited to prove this simple assertion, if proof were actually needed, but, to save time, I shall not dwell on it at length. I cannot help saying one word in this connection, namely, that this problem has been studied by very few of our public men and has not consequently received that attention which it deserves. I should like some of our economists to make a special study of this branch of the subject and make the Government realize that we consider this treatment to be as unjust as it is wrong.

The problem of banking, currency and finance, is not the less important. It is clear that in currency matters, as in several others, the Government of India is at the mercy of the India Office and the Secretary of State's action is guided by the Counsels of London financiers. The latter see no good in allowing quantities of gold going away from London to India in payment for the goods imported from this country. The Secretary of State, therefore, sells consols far above his demands in lieu of home charges and India's mints have to be set working to pay off the bills. Then it passes my understanding why the Secretary of State, or the India Office for that matter, should lend Indian money in England at a

nominal rate of interest—money which could be lent in India at nearly double the rate of interest and utilised in the development of her own industrial resources. The Government of India's policy in depositing public money with banks, which help Indian industries, very little, is equally objectionable. This conference, I feel sure, will give due consideration to these and cognate subjects.

A few words about the Industries Commission and I shall have finished. Gentlemen, it is said in some quarters that India no longer needs committees and commissions and it is statesman-like *action* that is needed. I do not say that those who think on these lines are wrong, because the results of such commissions have so far been anything but satisfactory, but my own view is that committees and commissions can be useful, if they are suitably constituted and the scope and the method of their investigation are on right lines. The present commission is not quite as we wanted it to be. In the first place, the all-important question of Tariffs has been excluded from its scope of enquiry. In the second place, the representation of purely Indian industrial interests, is not quite adequate and then the witnesses to give evidence are not properly selected. The majority of the latter are European traders and mill-owners whose narrow sense of patriotism does not allow them to speak as frankly, as they ought to. Instead of thinking that an industrially strong and prosperous India would be of immense benefit to England and the Empire at large, most of them think that prosperity of India means a corresponding decline of British industries. This is not what is needed in India. The Commission have been sitting for some time and the European witnesses, with honorable exceptions here and there, have seldom recommended direct and effective State help to purely Indian industries. Besides such commissions take unnecessarily long time in the conclusion of their labours. For two years the present commission will investigate. They will take another year or so for writing out their report, which may not see the light of day for some time more. By that time the war will certainly be over and soon after *status quo ante bellum* will be restored and who knows whether Government, under new conditions, may or may not be able to give us effective help in the development of industries which, owing to absence of competition from certain quarters, can be established here now. It is, therefore, essential that without waiting for the publication of the recommendations of the commission, the Indian Government should come to

our help at once and lay the foundation of industries for which this is the most suitable moment

Gentlemen, I fear I have already trespassed on your time and on your patience and lest I may unnecessarily stand between you and the President elect of this Conference any longer I finish my speech and bid you a most cordial welcome again I pray that our labours to-day may bring forth fruits which may do standing good to the country which, once, not only supplied her own requirements, but was the means of feeding and clothing many other countries which to-day look down upon us as a lot of unpractical people I hope to be excused for the many shortcomings which you must have noticed in this speech, but my long illness and broken health are mainly responsible for the same

## ELECTION OF PRESIDENT

*The Hon Pandit Gokarnath Misra —*

Gentlemen,—I now call upon you to proceed to formally elect your President of this year's Session of the Industrial Conference

*Sir Vithaldas D Thackersey.*—Gentlemen,—I have very great pleasure to propose that the Hon'ble Rai Sitanath Roy Bahadur be elected President of this Conference This proposition does not need many words from me to commend it to you The Hon Rai Sitanath Roy has been known to you for a long time He has been a Member of the Imperial Legislative Council for the last four years for the first two years he was nominated by the Government as a member of the Imperial Council, representing the Indian Commercial interests, and last year he was elected by the Bengal Legislative Council to the Imperial Council He is a large Zamindar in Calcutta I have had the pleasure of knowing him for many years He has been keen in helping the development of Indian industries, and I am sure we cannot do better than to elect him to preside over the deliberations of this Conference

The Hon Mr Manmohandas Ramji (Bombay) seconded the proposal in fitting words

The Chairman of the Reception Committee then declared that the Hon'ble Rai Sitanath Roy Bahadur was duly elected President and the latter took the presidential chair amidst great cheering

# THE PRESIDENTIAL ADDRESS

OF THE

Hon'ble Rai Sitanath Roy Bahadur

Mr Chairman of the Reception Committee, Brother Delegates, Ladies and Gentlemen,

I thank you most heartily for the great honour you have done me by electing me President of the Twelfth Session of the Indian Industrial Conference. When the offer of the Presidentship was first communicated to me, two considerations made me hesitate for a moment in accepting the kind offer. The first was the consciousness of my own incompetence for a position which had been held with dignity and conspicuous ability by a succession of distinguished men like Mr R C Dutt, Sir Vithaldas Damodar Thakersey, Sir Rajendra Mookerjee, and Sir Dorabji Tata. The second consideration was the state of my health, which was very poor at the time and which is far from strong even now. A sense of duty to my country, however, has prevailed over other considerations, and I am here in your midst ready to co-operate with you in your deliberations in my own humble way.

It is the custom here to commence the proceedings with an address from the President. As, however, many thoughtful men will discuss in detail the different industrial problems of the country, I do not propose to inflict a long speech on you, but will content myself with a few general observations.

Gentlemen, before speaking on the subject of today's deliberations, I could not help referring to the great conflict which is now raging in Europe. Never before has the world witnessed such a devastating war. But even this devastating war has not been without its uses. While the whole of Europe and considerable parts of Asia and Africa have been thrown into the vortex of this terrible war, we, in India, are living under a serene sky and in a tranquil atmosphere. It has helped us to realise the full meaning of Pax Britannica which enables us to continue our peaceful labour in India, while the storm is raging in full fury outside the boundaries of the country. And we, on our part, have not failed in our duty in this war. Our princes and people have demonstrated their loyal-

ty in an unmistakable manner and have borne the fair share of their burden in the defence of the British Empire. The war has brought India and England nearer to each other, and I have no doubt the bonds of unity which have been forged on the field of battle and tempered with our common blood, will bind us in affection and mutual esteem for all time to come.

Gentlemen, industrially India is almost on her last legs. While other countries have been making rapid strides in industrial progress, India has practically stood still. In the meanwhile, the population of the country has been growing, and a continuously increasing proportion of the people has been thrown upon agriculture for subsistence. In 1891, 62 per cent of the people were returned as depending on agriculture, in 1901, 68 per cent, and in 1911, 71 per cent. In England, of every hundred workers, 58 are engaged in industrial pursuits, and only 8 in agriculture, whereas in India the industries give employment to only 12 per cent of the population. This is, on the face of it, an unnatural state of things. It is a well-known fact that the occupation of agriculture, besides being precarious, is not so remunerative as manufacture. The result is that we are to-day very poor compared with other nations. And yet there was a time, when India was reckoned among the richest countries of the world. Poets loved to sing of the "wealth of Ind," and the vastness of her riches excited the cupidity of the foreign invader. The general notion which prevails among Europeans, that India has always been a mainly agricultural country is a wrong one. History tells us that, in very early times, the articles of export from India consisted of manufactured goods, while the imports were mainly raw materials. The Hindus attained to a marvellous perfection in manufacture at a very early period. The great writer on Indian polity, Chanakya, gives a detailed description of the various industries which were practised in India in the fourth century, B C. Beginning from the pre-Christian Era, through the Middle Ages down to the eighteenth century, Indian products were valued everywhere for their beauty and delicacy, and they found a ready market not in Asiatic countries alone, but in Europe. "The gossamer muslins of Dacca, beautiful shawls of Cashmere, and the brocaded silks of Delhi," says Montgomery Martin, "adorned the best beauties at the courts of Cæsars. Embossed and filigree metals, elaborate carvings in ivory, ebony and sandal-wood, brilliant dyed

chintzes, diamonds, uniquely set pearls and precious stones, embroidered velvets and carpets, highly wrought steel, excellent porcelain, and perfect naval architecture—were for ages the admiration of civilised mankind, and before London was known in history, India was the richest mart on the earth ”

From about the end of the eighteenth century, however, India began to lose her position as an important manufacturing country. The Industrial Revolution of Europe entirely changed the methods of production. Machinery supplanted hand labour, production on a small scale gave place to large-scale production, and a better and more efficient organisation was introduced. This great change resulted in a great increase of productive power. India, however, continued to move along the old paths. No attempt was made to increase efficiency by reorganising the Indian industries on modern lines. To these causes were added the efforts of the East India Company to crush the indigenous industries of the country. The causes of the industrial degeneration of the country have been thus summarised by Sir William Hunter: “Many circumstances conspired to injure the Indian industry in the last century. England excluded these fabrics not by fiscal duties, but by absolute prohibition. A change of fashion in the West Indies on the abolition of slavery, took away the best customer left to India. Then came the cheapness of production in Lancashire, due to improvements in machinery. Lastly, the high price of raw cotton during the American war, however beneficial to the cultivators, fairly broke down the local weaving trade in the cotton-growing tracts.”

I have thought fit to make these remarks, because a knowledge of the past history of Indian industry is likely to be helpful to us in our future work. On the one hand, it will strengthen our faith in the industrial possibility of India and, on the other, enable us to remove or avoid the causes which led to our industrial decadence.

The chief requisites for industrial development are the following — natural resources, labour of various grades, technical knowledge, capital, machinery, organisation, markets, transport facilities, state aid and business enterprise. I shall briefly discuss each of these factors.

Speaking in a general way, we may say that the natural resources of India are abundant. In this, the country possesses a

special advantage for the growth of industry. But it is strange that our raw materials should have to travel many thousands of miles to be converted into finished articles and then brought back and sold in the Indian market. The soil of India is fertile and is capable of yielding a large variety of agricultural products. The country is also rich in mineral resources. The soil conditions, however, are not the same in every province, nor are the mineral resources evenly distributed throughout the country. It is necessary to bear this in mind, in view of the fact that considerable losses have often resulted from a want of recognition of the suitability of a site for a particular industry. Thus, for instance, we know that cotton mills can best succeed in the Bombay Presidency, jute mills in Bengal, and iron industries in Chota Nagpur. It is always an advantage to start a large factory in a place where coal is obtainable at cheap cost. I do not mean, however, to suggest that proximity to the source of raw materials is the only factor in determining the suitability of sites for industries. Facilities for transporting goods to the market are also an important factor. It may sometimes be found profitable to bring raw materials from a distance and even to import them from abroad.

As for the second requisite, we all know that while labour is abundant in some parts, it is scarce in others. It is necessary, therefore, for the industrial development of the country to secure the mobility of labour. This can be done by removing the social prejudices of the labouring classes, by cheapening the railway fares, and by making the conditions of work in the factories more attractive. But quite as important as the quantity of labour is its quality. Labour is of various grades, but it is roughly divided into two sorts, namely, skilled and unskilled. The bulk of the labouring population, of course, belongs to the second class. The unskilled labourer is— notwithstanding his native intelligence, sobriety, and industrious habits—ignorant, slow, clumsy, in his methods of work and wasteful of materials and tools. One of the great needs of the hour is, therefore, the training of labour. For this purpose, schools should be started in suitable centres in every district for imparting industrial education of the primary sort, the chief object of which should be to improve the efficiency of the average labourer, so that he may turn out better and more work and get a better return for his labour. But a system of elementary general education must precede industrial education. Such elementary education

will be helpful to the workman in a variety of ways,—it will quicken his native intelligence, enable him to learn his trade in a short time, and make him more self-reliant

Expert knowledge is practically non-existent in the country, and until this defect is remedied, no great improvement of the industrial situation will be possible. Every province ought, in my opinion, to have a Technical College for the training of industrial experts and of supervisors and foremen. The course of study should include all industrial subjects suited to the province concerned, including agriculture, electrical and mechanical engineering, and mining. Lastly, at least one fully-equipped Technological Institute should be established for teaching the higher branches of industrial science. The Technological Institute and the Technical Colleges may be affiliated to the Universities and on their research side they may work in co-operation with the Tata Research Institute and other science institutions. Arrangements ought also to be made for the practical training of the students in mills and factories. When students have passed out of the Institute, the best among them may be sent abroad with scholarships to finish their education in the industrially advanced countries, where they might be afforded opportunities for studying the most up-to-date processes and methods of industrial work. In this connection, I may be pardoned for alluding to the widespread feeling of dissatisfaction which prevails among my countrymen at the manner in which Indians are prevented from entering factories and mills in the United Kingdom as apprentices. Surely, the India office which purchases huge quantities of stores from British factories ought to be able to remedy this deplorable state of things. The Indian Government also should insist on the admission of Indian apprentices into railway and other workshops. It will be sometime, however, before India will be able to produce from among her own sons the required number of industrial experts. Meanwhile, we must avail ourselves of the services of foreign experts for our industrial advancement.

I am not one of those who deprecate the services of foreign experts for the sole reason that they are not indigenous. On the contrary, I would take the liberty to impress that our industrial enterprises should never be placed under the charge of inefficient managers on the sole ground that they are indigenous, though not possessing expert knowledge or practical experience of their



work These works should be entrusted to men, who have made business the passionate study of their life and not the delight of their leisure hours Dilettantism nowhere pays in this world, least of all in the field of industry and commerce, where exclusive devotion alone ensures success When my firm proposed to start the East Bengal River Steam Service Company, the first and most formidable initial difficulty that confronted us was in securing the services of an expert who could advise us as to the best way we should proceed We knew almost nothing of the new business or of its requirements, but we had the good fortune then to find a ready and willing supporter in a very prominent and distinguished man of business, whose thorough knowledge and practical training in every branch of trade and commerce is always a guarantee of success—I mean Sir David Yule—with whose kind advice and assistance, I am glad to say, we were not only able to overcome our initial difficulties, but we were also able to successfully float the company, which we have since then been able to keep up in a proper state of efficiency

The next requisite is capital In the language of orthodox political economy, industry is limited by capital In India the amount of capital available for industrial purposes is small There is, it is true, some money lying idle in some hands, but the talk about the immensity of the hoarded capital of the country is a gross exaggeration The proverbial shyness of Indian capital is due in the main to two causes The first is the want of confidence in the capacity of the promoters and the doubtful nature of the concerns themselves Poor people cannot be expected to invest their little alls in undertakings, the success of which is more than problematical The second cause is that a large part of the available capital is already invested in land and in businesses where it earns decent rates of interest To draw out these moneys for investment in industries, two measures may be adopted Government may lend their support to industrial concerns and thus inspire confidence in the minds of the capitalists Inadequacy of capital is one of our chief obstacles to industrial progress In many instances, industries are started with their share-capital under-subscribed, with the result that the greater portion of the realised capital becomes fixed in the shape of building and machinery, and very little fluid capital is left with which to meet the working expenses They have thus to borrow very largely, and the payment of high rates of interest at which money is borrowed eats up all their profits and even occasions loss Before com-

mencing actual work, therefore, the promoters of industries should take care to maintain a reasonable ratio between the fixed and the circulating capital of the concern

Industrial undertakings, however, can never depend entirely on their own capital resources for meeting all their expenses. Credit is thus an essential condition of industry. In the words of Daniel Webster, "Credit has done more, a thousand times, to enrich nations than all the mines of the world." And as McLeod, the eminent economist, puts it "It is by the gradual extension of Banking and the development of Banking habits among the people that the future progress of India in wealth and prosperity is to be promoted." At present the Indian Banks are few in number, and their business is small. There is, of course, the indigenous system of credit, but what is wanted for industrial purposes is the modern Banking system. It is a deplorable fact that as a rule none of the Banks under foreign management lend moneys to Indian industrialists even when good security is offered. It is absolutely necessary, therefore, for Government to help in the extension of the banking system and to offer banking facilities for the growth of industries. This can be done by the establishment either of one State Bank for the whole of India with branches and sub-offices in all important centres or of a State Bank for each province. Mr J M Keynes, a member of the Chamberlain Commission, is a great advocate of a Central State Bank, and in his opinion, one of its most important advantages will be that it may help the development of Indian Joint-Stock Banks and finance the Co-operative Credit Societies. The State Bank will have at its disposal the profits of Note issue, the Cash Balances of the Indian and Provincial Governments, the District Treasury Balances, the Indian portion of the Gold Standard Reserve, and the Paper Currency Reserve. At present, these moneys either lie useless in the coffers of Government or are lent to approved borrowers in London. It very often happens that at the time of the greatest stringency of the money market, the coffers of Government are full. The establishment of a State Bank will make possible the utilisation of considerable portions of these moneys for the industrial advancement of the country. As regards lending in London, the richest monetary centre of the world, it looks like a case of misapplied philanthropy, and it would not be unreasonable to demand the use of India's money for India's benefit.

The State Bank, when started, may lend money either through its own industrial department or through state-aided industrial banks which may be started as accessories or adjuncts to the State Bank. The resources of the State Bank will perhaps be insufficient to meet the demands of industrial enterprise. In that case, I would suggest borrowing in the foreign market. The credit of the Indian Government is as a rule very good, and in normal times, it can borrow money within as well as outside the country at comparatively low rates of interest. A word may be said here about the much-debated question of Indian *vs* foreign capital. There is no real antagonism between the two. It is undeniable that the available capital in India is small, and it would certainly be to the best interests of the country to have the use of foreign capital. At the same time, it is necessary to take care that we pay only the interest on the capital borrowed, and do not, except under special circumstances, allow the profits to leave the country.

Machinery is only one form of capital, but it is a thing of such immense importance that it deserves to receive very careful attention from our industrial organisers. Many of us know that, owing to lack of capital, or for the sake of cheapness, or for want of knowledge, machinery of an inferior kind is often bought for our factories. This is a great mistake. The result of this shortsighted economy is that the industries have to work with a perpetual handicap. The output is comparatively small and such industries can never hope to successfully compete with those, in which better machinery is in use. This recalls to my mind the story of an American millionaire, who was inspecting a newly-erected factory of his with a view to starting its work. He was accompanied by an expert, who informed him that although the machinery was very good, a more modern type had been invented during the period of its installation. The millionaire who had spent millions of dollars on the purchase of the machinery, instantly ordered it to be scrapped and replaced by one of a more up-to-date type. It should always be borne in mind that the better the machinery, the less is the cost of production, and consequently the greater is the success of the undertaking. Connected with this subject, is that of supplying the energy needed for driving the machine. At present, steam-power is mostly used in factories. But the use of electricity may help in reducing the working expenses. In this connection, it is very satis-

factory to note the successful completion of the Tata Hydro-electric scheme. It is to be hoped that other schemes of a similar nature will be undertaken in the near future

Another very important requisite is efficient business organisation. Organisation is the key to success, and the chief characteristics of modern industry are summed up in this one word. As regards the constitution of large industrial concerns, it is clear that individual ownership is, and must in the very nature of things be, very rare. We must, therefore, look to partnerships, private companies, and limited liability companies for the solution of our industrial problem. Hitherto the establishment of companies has not been very successful. This has been due to a want of confidence in the capacity of the company promoters and, in some cases, want of honesty on the part of managers. Efficiency of industrial organisation depends in a very large measure on the moral and intellectual qualities of the persons in whom control and responsibility are vested. Unfortunately, we very often find that the Directorate Boards of many of our industrial concerns are composed of men, who cannot bring to their work expert knowledge, which is so essential for successful management. The duties of organisers of modern industry are so multifarious and so important, that they cannot be safely left in the hands of amateurs. As a well-known economist observes, "the armies of industry can no more be raised, equipped, held together, moved and engaged, without their commanders, than can the armies of war." For the proper training of such captains of industry, commercial education is essential. The would-be captain should, besides acquiring a general knowledge of economic science, make a serious study of the special problems, which arise in this country regarding the production, distribution, and exchange of commodities. The course of instruction ought to include subjects like commercial law and history, banking methods, import and export problems, exchange rates, transport, freight, and insurance, company management, and the conditions of markets. Commercial instruction is also necessary for those who are to occupy that the economic interests of the country should not be wholly ignored. - It has been suggested in this connection by eminent public men that the management of Railways should be taken over by Government. Another way of solving the problem would be to appoint a permanent Commission on the lines of the Railway and

Canal Commission of England This body should consist of two High Court Judges assisted by Indian and European expert Assessors, and should have power to revise or modify rates, whenever such revision or modification may appear to them necessary in the interests of justice and fairness If further concession rates are fixed for raw materials and machinery, it will go far towards stimulating the economic development of the country Railways, however, are not the only agency for the transport of goods In some parts of the country, water carriage is very economical, and the construction and improvement of waterways ought to engage the serious attention of Government.

I now pass on to the ninth requisite, namely, State aid. It is now recognised everywhere that the part which the State can play in the economic development of a country is very great The old laissez-faire doctrine gradually lost its hold on the minds of thinkers by about the last quarter of the nineteenth century and Germany and Japan have recently given the quietus to it In most of the civilised countries of the modern world, the State does everything in its power to promote national industry The economic development of Japan has been systematically fostered by the State. Besides subsidising struggling industries, the Government some years ago set up model factories and pioneered many industries, which have now become the source of immense wealth to the country. In Hungary, where the conditions are in many respects similar to those of India, the State has rendered immense help to industry In addition to the maintenance of a protective tariff and the indirect support given to indigenous industries by the guarantee that all requirements of the State and public authorities should be supplied by home industries, the Government has made various legislative provisions for their encouragement. The main provisions of Act III of 1907 relate to (1) exemptions from taxation and road dues, (2) reduced rates for railway transport and concessions in respect of customs and excise duties and of expropriation, (3) the delivery of industrial salt at a price below that normally charged, (4) the encouragement of the building of work-men's dwellings, (5) the development of industry by a guarantee that all public contracts should be placed with Hungarian firms, and (6) encouragement of industry by direct grants of money As might be expected, these measures have resulted in a great expansion of production and trade

In India, until very recently, a very narrow conception of the duties of the State towards industry prevailed, and beyond publishing information and instituting occasional enquiries as to existing conditions, Government did nothing to foster the growth of industries. In recent years, however, Government has evinced some interest in the matter. The work of the Madras Department of Industries in making successful experiments with chrome-tanning and aluminium ware and the encouragement given by the United Provinces Government to the sugar industry are cases in point. But the most notable instance of a change of policy is to be found in the appointment of the Indian Industrial Commission, which has already commenced its labours. The Commission is presided over by a great scientific expert, and it includes successful businessmen like Sir Dorab Tata and Sir R N Mukherjee, and Sir Fazulbhoy Currimbhoy, and it is confidently expected that beneficial results will flow from the deliberations of the Commission. High hopes have been raised, and unless practical measures of a far-reaching character are adopted, the feeling of disappointment will be very keen.

The Government can help the industrial development of the country in a variety of ways. Some of these have already been indicated. I have said that Government Banks ought to grant loans to industrialists on easy terms whenever proper security is offered. I have also urged the necessity for government action in the matter of providing for transport facilities. But other and more direct forms of State assistance are needed. One suitable form of Government aid would be to guarantee a reasonable rate of dividend when the concern appears to be a perfectly sound one. This will go far towards solving the difficulty of raising capital for industrial purposes. Bounties and subsidies would be much appreciated in the first stage of a new industry or in the case of a struggling industry, especially where the industry has to contend against the unfair competition of a bounty-fed or subsidised foreign industry. Demonstration and pioneer factories will be very useful as object lessons and will serve as incentives to private enterprises. When the success of such factories has been established beyond doubt, they should be handed over to Joint-Stock companies, unless the industries are necessary for government purposes or are of public utility. Government ought always to give encouragement to local

industries by undertaking to purchase their products whenever the articles are of a passable quality and the prices are not too high. The action of the Government in this respect in the past has not always been satisfactory and it is necessary to insist in this connection on the reduction in size of the Stores Department of the India Office in London

It goes without saying, that if the State has to undertake all these duties, it must be provided with the proper kind of machinery. Every province ought to have its Department of Industries with an expert Director at its head, assisted by a competent Board consisting of officials and non-officials. Government aid is needed for enabling struggling Indian Industries to stand on their own legs and for the establishment of new ones. The well-organised and fully-developed industries owned and controlled by Europeans but located in India do not call for any assistance at the hands of Government. We have no quarrel with the European industrialists and we ought not to fret over the success which has attended their efforts. On the contrary, we ought to feel thankful to them for having shown us the way in this matter. But it is necessary to point out that the country does not derive the same amount of benefit from foreign business enterprises, as from those which are financed with Indian capital and managed by Indian brains.

Useful as these different forms of State aid are likely to be, the most successful way in which the Government can help Indian industry is by tariff protection. There, is no charm in either the word 'free trade' or the word 'protection'. Whether the policy of a nation should be one of free trade or of protection ought to depend on circumstances. Most of the advanced nations of the world believe in protection. England, on the other hand, which has to depend on foreign countries for the supply of raw materials for her manufactures, finds it to her interest to maintain a system of free trade. But even England has not always been a free-trader. In the initial stages of her industrial development, she pursued the policy of protection. The way in which she protected her products against the manufactured goods of India, is too-well-known to need re-iteration.

Nations must modify their systems according to the measure of their own progress. In the present stage of her industrial de-

velopment, India can hope to compete with industrially strong nations like Germany, United States, and Japan, only with the aid of a protective tariff. I do not, however, suggest that protection should be given indiscriminately to each and every industry and that for all time. A careful selection should be made of the industries requiring protective aid with a view to their importance in the economy of Indian life and their chances of ultimate success, and when they have passed the infant stage of growth, this aid should be withdrawn. The present European conflict has brought into prominence another argument in favour of protection, namely, economic independence and national safety in case of war. It behoves Government and our public men to give their most earnest attention to this aspect of the question.

A word may here be said about the question of Imperial Preference. The question has been frequently discussed in England in recent years, but in these discussions, the interests of India have not always been kept in view. Before the leaders of Indian public opinion are asked to subscribe to a policy of Imperial Preference, they will have to be convinced of the benefits which will accrue to the country from its adoption. In the words of Lord Crewe, "they will not allow themselves to be hurried blindfold to the goal, at which the prize will be distributed to their inevitable disadvantage." The British Empire is certainly capable of a closer and more effective commercial union, but this will be possible, only when its constituent parts, India included, will stand on a footing of absolute equality.

I have so far dealt with large industries, because I am convinced that the industrial regeneration of India can come only through the adoption of the system of large-scale production and the most up-to-date business methods. I do not, however, suggest that handicrafts and cottage-industries should be allowed to die out. Where extreme care and delicate handling are essential, hand-work possesses a natural advantage over the machine, and will successfully withstand the competition of the latter. Artistic work will always continue to be done by the hand. In many cases, handicrafts may also flourish as industries subsidiary or supplementary to large-scale industries. The handicrafts ought, however, to be re-organised and made more efficient. Sometimes, the use of small labour-saving



machines will add considerably to their productivity. Small factories will also often be found very profitable. In the reorganisation of these small industries, co-operation is likely to play a very important part. The Co-operative Credit Societies at present confine their operations mainly to agriculture, but it is to be hoped that gradually they will see their way to embrace industries also within their scope of work. Government also ought to assist them in various ways, e.g. by supplying to them machinery on the hire-purchase system and by selling to them raw materials at wholesale price. The domestic or commission system should receive our special attention. One great merit of this system is that it can offer employment to women of the middle class. The interposition of the middleman between the domestic producer and the consumer will help in developing the home industries, for then the producer will obtain a market for his work, and the consumer a wide choice in the satisfaction of his wants. Exhibitions and fairs will also be beneficial to their growth in encouraging their sale and creating new markets for them. I desire to note here with satisfaction that an Association has recently been started in Calcutta under the patronage of Her Excellency Lady Carmichael for the encouragement of home industries.

I have now briefly discussed some of the important requisites of Indian industrial development. But I want to impress upon you that there is one requisite which is more important than all the others, and without which no improvement in our industrial position will be possible. This is enterprise. However favourably situated a country may be in respect of its natural resources, however perfect may be its political constitution and whatever advantages it may possess in the way of labour and facilities of communication, it can never be industrially great, unless its people possess the moral quality of enterprise in an adequate degree. The old adage "nothing venture, nothing gain" is very true. Some amount of risk is involved in every undertaking, industrial or other. But the enterprising man faces risks and overcomes them, while the timid person turns away from dangers and never achieves any success. It is absolutely necessary for us, therefore, to cultivate the spirit of "push and go". If stout hearts are combined with subtle brains, the industrial problem will be easily solved.

For over a century we have been in a state of industrial paralysis and helpless dependence. It is a long descent from providing

the luxuries for the ancient Empires of Asia and Europe to become the mere purveyors of food and raw materials for the more enterprising nations of to-day. The whole world is being stirred with new aspirations and India feels the throb of the new life pulsating through her veins. To realise this new life, is to be industrially great. And India feels it. It is not going to be merely a fleeting sensation, a temporary stimulus. Questions of vital importance of the readjustment of our social, political and educational positions in view of a larger industrial life are engaging the serious attention of our countrymen, and I feel confident that the narrow views, prejudices, if you please, which hampered the growth of our industrial life are rapidly giving way under the stress of the new conditions which are confronting us on all sides. And not the people alone, but the Government of India have grasped the essential needs of the situation and we hope we shall strive together in perfect accord towards the attainment of the ideal before us. And in this connection the labours of the Industrial Conference through a long series of years have not been altogether thrown away. We have appealed to and awakened the national consciousness of our people. I see signs on all sides of its being thoroughly roused. I see before me the picture of an awakened India. I see her teeming millions working in her mines and her factories dotted all over her surface, along the banks of her mighty and majestic rivers and along her sea-washed shores, I see them bringing to the cultivation of her ancient soil new discoveries of science and I see her green pastures and irrigated fields no longer at the tender mercies of uncertain monsoons, I see again that old-time wealth of India, her immense herds of cattle better bred, better fed, and better preserved, not swept away with her men when the rains fail. I see her cottages once more full of busy life, I see the gaunt spectre of famine stalking away from her fair face, I see the Indian and distant seas ploughed once more by Indian ships manned by Indian crews, navigated by Indian mariners, and laden with Indian merchandize, I see India bringing again to distant nations through routes on land and sea her great gift of a spiritual civilization which the nations of the world are vainly seeking to attain, and may I close in the prophetic words of a poet and seer—"Methinks I see in my mind a noble and puissant nation rousing herself like a strong man after sleep, and shaking her invincible locks. Methinks I see her as an eagle renovating her mighty youth and kindling her undazzled eyes at the full mid-day

beam purging and unsealing her long deceived sight at the fountain itself of heavenly radiance ”

And let us pray to Him who knows His time that the promise of the day may be soon fulfilled.

## THE SECRETARY'S ANNUAL REPORT

The Hon'ble Rao Bahadur R. N. Mudholkar General Secretary, was called upon by the President to present the Annual Report

The Hon Rao Bahadur R. N. Mudholkar —

In accordance with the usual practice of the Conference, I beg to submit the annual report. which I have drawn up In this report, there are the following statements In the first, is the report of the work of the Conference, whatever it has done In the second, is the report of the General Industrial activity in the country, dealing first of all with the action taken by the Government and action by Native States, action by Government dividing itself into action by Imperial Government and action by Provincial Governments, and action by Native States, and finally comes action taken by the people The report, copies of which have been distributed to you, will show our work during the last year You will see that out of the whole amount of Rs 8,000 voted last year all that the Conference office received was only Rs 2,500 How that amount has been applied will be seen from the Balance Sheet appended to the report It will be admitted that this amount is certainly small What is wanted is to have interest created in the country and at least to have one qualified person, who could speak on some of the main industrial questions of the day, and go through the country for rousing enthusiasm, collecting information and making enquiries on the spot in regard to the difficulties experienced in the various places Unless a sufficient amount is raised, it is difficult to send a man out for such a purpose The Conference office sent out two circulars, one in regard to my idea about what should be done by the Industrial Conference The idea was that, instead of calling papers on all sorts of questions and having a number of resolutions repeated from time to time, we should confine our attention to two or three industries and to call papers on them

from qualified persons and to invite discussion on those papers. Similarly, with regard to Resolutions, the idea was that we should take each year two or three important subjects and discuss them thoroughly. The matter is practically where it was last year. Similarly, with regard to information asked about persons from whom various kinds of information could be obtained and who would take part in furthering industrial development and so on, very few replies have been received. The Constitution of the Conference was another question which has been engaging the attention of the Conference since 1914. In 1914, the Madras Reception Committee drew up certain main points and their suggestions were adopted by the Subjects Committee and laid before and accepted by the Conference. A sub-committee was appointed to examine them and to submit a detailed scheme. It was found that it was not sufficient to draw up one or more schemes by one or more men. It was necessary to have a discussion about the matter and that difficulty was pointed out in a note which was sent out to the members. The Subjects Committee considered the question last year and the matter was brought forward before the Conference last year by the President, Sir Dorabji J Tata. Then a Committee was appointed to meet in Bombay on the 28th. Some of us met and discussed certain points and it was only in regard to one point that some kind of agreement was reached. There were other matters that had to be considered, but most of the members having left, the meeting was adjourned till the 30th. It is in this condition that the matter now comes before you to-day. The matter will be moved in a formal proposition before you. I only indicate why the constitution is not submitted to you now. Another matter is about the appointment of the Indian Industrial Commission. In regard to that, men belonging to the Conference have been examined as witnesses and many more will be examined. The idea was suggested that the Conference should appoint a small committee of qualified persons to draw up a note which would represent the views not of any one individual in particular but the general view of the Conference. This question was considered yesterday and a resolution will be placed before you to-day. This is the main purport of the report. In regard to the Industries Commission, I would point out to you that, though its scope is not as wide as it should be, there are very many important points in regard to which we should not allow judgment to be passed against us by

default It would have been very desirable and it was most necessary that the question of the fiscal policy of the Empire, the question of the currency system and so on should have been referred to the Commission. But they have not been referred. It would not be proper to leave out other matters. These matters are (a) drawing out capital now lying idle; (b) building up an artisan population, (c) carrying on the scientific and technical researches required to test the known raw materials and to design and improve processes of manufacture; (d) distributing the information obtained from researches and from the results of experiments in other countries, and (e) developing machinery for (1) financing industrial undertakings, and (2) marketing products.

Thus is the report and I lay it before you Appended to the report is the balance sheet which I shall read now

(THE BALANCE SHEET WAS READ).

I understand from the Assistant Secretary that the account book itself has been brought here and if any member of the Conference wishes it, he can on application have a look at it.

The President —I now call upon Mr. O Gopal Menon to propose the adoption of the Annual Report.

#### ADOPTION OF THE ANNUAL REPORT.

Mr O. Gopal Menon:—Mr. President and Gentlemen, I have great pleasure in proposing the adoption of the report, which has been just placed before you by Rao Bahadur<sup>1</sup> Mudholkar I find that the accounts have been audited by Associated Accountants in Bombay—Messrs. Khare and Co Showing the balance of Rs. 7,368-12-1 The only suggestion that I wish to put forward is that in future, if the reports are placed in the hands of the Standing Committee 15 days before the holding of the Conference, it would enable the members of that committee to go through them I hope that this suggestion will be carried out next year.

The President —I call upon Mr J K. Mehta to second the motion

Mr. J K Mehta —Mr. President and Gentlemen, I rise to second the motion for the adoption of the report Unfortunately we have not been able to go through it, but I take it that all that

it contains is a true description of the activities that took place during the year. We also find that the balance sheet is included in the report with the audited signature of Messrs. Khare and Co., Honorary auditors. It is stated that the auditors examined the cash and that the balance sheet is correct. We also have to take that as correct. With these words, I second the adoption of the report.

Mr V R Karandikar (to Mr. J K. Mehta) —Are you satisfied that the cash balance deposited with the Berar Oil Works Co., Ltd is a proper security?

Rao Bahadur R. N. Mudholkar —Yes, it is payable within 8 days' notice.

Mr. O Doraiswamy Iyengar —May I ask whether it is a recognised security and also whether the Conference Office or anybody connected with it has anything to do with the Berar Oil Works Co.?

Rao Bahadur R. N. Mudholkar :—At the last year's Conference, I pointed out the difficulty in depositing money with any one. Our Conference is an unregistered body. If you deposit the cash balance with any person and that person becomes insolvent, or there is difficulty in recovering it, our position becomes unsafe. Last year, I said that if the Conference wants me to deposit it, I would do so with persons with whom there would be no difficulty. There was a case in Berar which went up as far as the High Court. There are what we call Combinations which are unregistered associations. A person had entered into an agreement that he would pay a certain portion of his profit. The man broke the agreement and executed a bond in favour of the Secretary of the Combination association. Still he refused to pay. The Secretary brought a suit, but the District Court and the High Court held that being an unregistered body consisting of more than 20 persons, no suit could lie, and the claim was consequently thrown out, and something like Rs 25,000 was lost. That was the reason why for a long time our balance could not be invested. Persons to whom loans were at times given on my guarantee, came to difficulties and I had to make good the loss myself. I therefore declined to invest the cash balance anywhere, unless the money was put into a concern of which, I am a director. You asked for an investment and I could only put it with a body, which could not question my work.

Mr M. S. Kamath.—Why was the rate of interest 9 per cent. last year and six per cent. this year ?

Rao Bahadur R. N. Mudholkar —The money being payable on demand they declined to give more than 6 per cent. They said ' If you like keep it with us, you may on these conditions, if not, do not keep it with us '

The Hon Mr. C. V. Mehta then rose to speak.

At this stage the President said.—I cannot allow discussion of this kind to go on. The explanation given by Mr Mudholkar is quite satisfactory. If you go on throwing discredit on a gentleman, who has done much for the industrial development of the country, no one would come forward here to do such work.

The Hon Mr C V Mehta —I have not made any remarks as yet regarding any person. I cannot therefore understand the President's objecting to my speaking. I did not want to throw discredit on anybody's work.

The President —Then you may go on.

The Hon Mr C. V. Mehta —All I wish to point out is about the investment of the cash balance. It seems to me that, as the Secretary has just explained to the Conference, he has had great difficulties in investing the money. One of the resolutions before the Conference to-day is that the Office of the Conference should be removed to Bombay, and I suggest that the Secretary in future should make this investment of the cash balance with the sanction of the Standing Committee.

The President.—Is it your pleasure that the Report should be adopted ?

The members having replied ' Yes ' the motion was declared carried.

Rao Bahadur R. N. Mudholkar.—There is another formal matter which has to be done, and that is about the laying of papers on commercial and economic subjects on the table. This has to be done rather hurriedly this time. This year on account of so many persons having been called upon to give evidence before the Industries Commission, many men of prominence who generally contributed papers to the Conference, found it difficult to write

this time Out of 13 papers received this year, only a few were received in time to be printed I beg to lay the papers on the table and move that they be accepted by the Conference The following is the list of papers :—

- (1) The early history of Co-operative Credit, its main principles and advantages and their application to India, by Babu Sheo Charan Lal, Gwalior
- (2) Paper manufacture, by Mr Ahmed Hassan, Lucknow
- (3) Paper industry, by Mr H. D Singh, Lucknow
- (4) Rusa oil industry, by Mr H R Pitke, Akola
- (5) Glass manufacture, by Rai Saheb Lala Panna Lal, Ambala City
- (6) Importance of modern inventions and discoveries, by Mr. N M. Sant, Bombay.
- (7) Possibilities of perfume industry in India, by Mr J P Srivastava, Cawnpore
- (8) A few suggestions for improvement in Sugar Production in U. P , by Babu Muktar Singh, Meerut.
- (9) The Swadeshi movement, by Mr M. B. Sant, Assistant Secretary, Industrial Conference, Amraoti
- (10) Plantain fibre industry, by Mr J. N. Banerjee, Madhupur.
- (11) First three essentials of Industrial Development and need for a business education, by Mr S Gill, Auditor, Lucknow.
- (12) Value of research, by Dr. Harish Chandra, Ph. D , Dehra Dun.
- (13) Insurance Drain on India, by Mr W T. Halai, Bombay.

*N B.*—The majority of the papers having been submitted late, could not be printed for free distribution. More papers are still coming in.

THE LATE HON. MUNSHI PRAG NARAIN BHARGAVA.

The President —Gentlemen, I put from the chair the following resolution —



“That this Conference records its profound sorrow at the death of the late Hon’ble Munshi Prag Narain Bhargava, Chairman of this year’s Reception Committee of the Conference, in whom the United Provinces have lost a leading industrialist and a great sympathiser with the industrial development of the country ”

With respect to the late Munshi Prag Narain Bhargava, I have to say a few words. It is a most melancholy duty, that I have been called upon to perform. In his untimely death India has lost a worthy son of a worthy father. He was the illustrious son of the late lamented Munshi a well-known pioneer of modern industries in this province. He was connected not only with many industries but with many progressive movements in this country. As a representative of the commercial community on the Local Council and as President of the Gorakpur Provincial Industrial Conference, he rendered valuable services to the motherland. In him both the Government and the governed had implicit confidence. He was the proprietor of the Newal Kishore Printing Press and also of the Lucknow Paper Mills. He was the proprietor of paper pulp manufacturing industry and was one of the main pillars of the daily vernacular Press here. But the inscrutable Providence has taken him away in the prime of his life, and to-day we are deprived of his practical guidance. We deplore his death very much. With these words, I call upon you, gentlemen, to pass this resolution standing.

The resolution was carried, the audience standing in solemn silence.

#### THE LATE MR. G. SUBRAMANĪA IYER.

The President —The next resolution is of a similar character and I put it from the chair. It runs as follows:—

“This Conference expresses its deep sorrow also at the death of Mr. Subramania Iyer who was the great champion of the Industrial development of the country and who had done much in his life time to promote this cause by his work for the National Fund and Industrial Association of Madras.”

You will carry the resolution similarly standing.

The resolution was carried, the audience standing in solemn silence.

## STATE MANAGEMENT OF THE RAILWAYS.

Sir Vithaldas D. Thackersey.—Mr. President and Gentlemen I beg to move the resolution which has been placed in my hands, and it runs thus,—

“That this Conference is of opinion that in the interests of the country, it is essential that the management of the railways, not at present managed by the State, be taken over by it as opportunity occurs.”

Gentlemen, many of you may be aware, that in India out of 32,000 miles of railways, about 8,000 miles are managed by the Government direct and the rest by private agencies or companies. The Railways owned by the Government are about 26,000 miles, all the main trunk lines are owned by Government. We are indebted to them for the wise policy, they initiated about 35 years ago of purchasing the Railways, as the contracts fell due and now the position is that all the trunk lines belong to Government and part of them are managed by state and part of them are managed by private companies. By this resolution, we request Government to take over the remaining state-owned lines for management by the State. I do not for a moment say that the railways as at present managed, are very badly managed, but our reason for requesting Government to take over the management of the railways is that it is not enough that railways are well-managed but that they must be managed for the development of and in the interest of the country. It is not enough that it should make profit and show good return on the money invested, but it is necessary that the rates are such as would develop the internal trade of the country. Instead of that, what do we find now? On the principle of train loads and long distances, the rates, practically for all foreign commodities, are the lowest in our railway tariff. All the rates from sea ports to inside the country, are lowest while for inter-provincial trade, they are very high. The result is that foreign produce coming out to India in bulk, gets the advantage of the lowest tariff, while the Indian industries producing manufactured articles on a small scale, have to pay considerably high tariff. We say that the railways should be owned by India and therefore the first duty of the railways is to give such rates as would encourage Indian industries. Take for instance, the question of long load and wagon load. Naturally, from all foreign places, goods come

by different steamers. They are loaded in train at a port and are carried to Delhi, Agra, Amritsar and other long distances. How can we expect small industries like candles or small match factories giving a train load every time. They must despatch their boxes every day. What we want our railways to do, is that they must carry them at the same rate as the foreign commodities are carried. Otherwise our small industries cannot compete with larger ones. Take again the case of third-class passengers. They contribute the largest income to our railways. Still, the difficulties of those passengers are so well-known that I need not enumerate them now. Another advantage of taking over management of railways by the state is that, there will be a saving to our Indian Revenue of about a crore of rupees. Our Secretary corrects me and says that the saving will be more than a crore of rupees. But I take a conservative figure and say that the Government will save at least a crore of rupees every year by taking over the management, because that is the share of the profit that goes to the companies that manage the railways. Then, we must bear in mind that all these railways are large consumers of stores. Most of these stores are bought in England, where the Boards of Directors have their offices. The Government of India have issued a notification that in cases where Indian articles are found to be of good quality and are obtainable not at unfavourable rates they should be purchased in India, but that rule is not applicable to the railways. If the railways are managed by Government, we can compel Government or bring pressure to bear upon them through members of the Legislative Council to issue an order that stores required for the railways should be purchased in India as far as possible. These railways, as you are aware, are owned by different companies. They have got geographical limits and on the Bombay side, there is the B B & C. I. Railway and on the Calcutta side there is the East India Railway. They tried to take traffic on their own stations. If on the North-Western Railway, goods are sent to Karachi, they will be given more favourable rates than those given to an article sent to Bombay or vice versa. The G. I. P. Railway must send it to Bombay under a system which is called block system. If it is sent by the East India Railway you have to carry it to Calcutta and, at the Terminus station, they put a heavy rate. Merchants cannot send goods to places where they require them to be sent, but to places which pay the Railway companies best,

That is not a satisfactory position. I do not wish to speak at length on this subject, but I will content myself with stating that there was an instance in Bombay, where a representation was made by a citizen of Broach about the rate fixed by B B & C. I Ry. The representation was supported by the Government of Bombay and Lord Sydenham said that the railways were made for India and not India for the Railways. The question is of very immediate importance because the Government of India have asked for opinions from several commercial bodies in India. The contract of the East India Railway would terminate in 1919, and this resolution of the Conference asks Government to take over the management of the East Indian Railway from the company in 1919. So far as this railway is concerned, the advantage of Government management is that we would save 20 to 24 lakhs of rupees that are now given to the company as their share of the profit every year. I need not say more, and I hope that you will pass the resolution unanimously (Cheers).

MR. A. RANGASWAMY IYENGAR (MADRAS) —

Mr. President and Gentlemen, I have great pleasure in seconding the resolution, which has been so ably moved by Sir Vithaldas Thackersay who is an authority on this matter. You will recollect that he moved a resolution in the Imperial Legislative Council on this question of railway management and he brought out facts and figures to show how the management of railways by companies has operated to the detriment of the industrial development of this country. I shall not say much on the matter, but I shall mention only two points which we should bear in mind in this connection. One thing which we hope will be brought about by a transfer of management of railways from company to State is that railway development will proceed on more normal and rapid lines than it has been allowed to proceed under company management. When railways are managed by companies they share half the profit but only contribute one-tenth, one thirteenth or one-fourteenth of the capital involved. It is not to their interest to develop railways which as they say will shortcircuit their system. If railways are to develop, they will necessarily short-circuit the system of existing railways. If companies are allowed to block the development of new railways by conditions which are onerous, the result would be to put off the development of railways indefinitely until the State is in a position

to terminate the contracts with companies. In South India, we find that a number of railway projects which are undertaken by the State and by District Boards have been obstructed and been held over for a long number of years, because those lines if constructed will short-circuit other lines and thereby the profits of the companies will be reduced. If the railways are managed by the State, any curtailment of the profit which is undoubtedly problematical would be a very small thing compared to the great advantage that the public would derive from the State management of railways. Therefore, when the railways are owned by the State and when they are treated not merely as property of the state but as means of performing public service to the community, I think it is a duty of the State to see that the management is also in their hands, so that further railway development may take place to the advantage of the public. We find that if foreign companies control the management of railways, the public are not in a position to bring pressure to bear upon the Boards of Directors for facilitating conveniences. I shall give one instance we wanted that an overbridge which was exposed to the sun for a series of years and over which passengers had to struggle on for a long distance should be covered. We brought the matter to the notice of the Local Government, but they said that they had no power over the Railway Board, and that the companies were the masters of the situation. If Government had managed the railways, this inconvenience to poor, old, infirm people who had to walk in the sun for a long distance on over-bridges in noon-day heat would be prevented. In the matter of providing conveniences to third-class passengers on railway platforms and in carriages and refreshment rooms, if the railways are in the hands of the State, we shall have much better conveniences to third-class passengers than we have now under the management by companies. After all, we should recollect that railways perform a public function it is not like private service. Railways are common carriers and even in England, where we find that railways are owned by capitalists, the State exercises a good deal of control. We think therefore that management of railways in India particularly should be in the hands of Government. It should also be remembered that when these railways are managed by the State, it is not merely pound, shilling, pence or the return on the capital invested on the railways that should matter to the Government. Government should so manage the railways that

they contribute to the greatest welfare of the community, and the immediate return on the capital invested should be a small matter compared to the general prosperity of the country, which would be promoted if the railways are in the hands of the State and if the State manages them on behalf of the public, and if such management is controlled by the public opinion of the country. With these words, I second the resolution.

The resolution was put to the Conference and carried unanimously.

### INDUSTRIAL COMMISSION.

The Hon. Mr. C. V. Mehta —Mr. President and Gentlemen, I have the honour to move the following resolution.

“A committee of the following five gentlemen be appointed to draw up a memorandum dealing with the questions referred to the Indian Industrial Commission, which should be circulated to the Standing Committee of the Conference and finally submitted to the next Session of the Conference for adoption. If it is necessary to send the memorandum earlier, a special Session of the Conference should be held in Bombay.”

“President—The Hon. Rai Sitanath Roy Bahadur, Members, —The Hon. Mr. Manimohandas Ramji, Sir Vithaldas D. Thackersey, Hon. Rao Bahadur R. N. Mudholkar and Mr. Vidyasagar Pandya; Secretary, Mr. J. K. Mehta”

“Gentlemen, You may wonder why the Conference has not prepared a memorandum while the Industries Commission has been sitting amongst us for so many months. It has been thought that if a memorandum was prepared and after adoption submitted by this Conference, it would perhaps carry far greater weight, than if it was prepared by a single individual or a body of individuals. It was, therefore, suggested that a committee of five gentlemen should prepare a memorandum and place it before the next session of the Conference. It was understood that the Industries Commission is to prolong its sittings for another year and more, so that there will be time enough for us to prepare and place a memorandum at the next session of the Conference and then submit it to the Commission. It is, however, provided in the resolution that should it be necessary to send this memorandum earlier, a

special session of the Conference will be held in Bombay about June 1917 for adoption of the memorandum. I therefore move the resolution.

Mr C Gopal Menon (Madras) —Mr President and Gentlemen,—Very few words are needed from me in seconding this resolution which is of a very formal character. Mr Mehta has explained to you that the Commission is going to remain in India for another year. There will be enough time for the Conference to gather information from different members who have in the past done a good deal of deliberative work on behalf of the Conference. There is no denying the fact that within the past ten years, this Conference has been able to collect and collate the thoughts of men who have devoted their attention to industrial questions. With that view, five names have been suggested from the different provinces to formulate and prepare a memorandum in order that the same may be forwarded to the Industries Commission. I have great pleasure in seconding the resolution.

The Resolution was then put to the Conference and carried unanimously.

### OMNIBUS RESOLUTION.

RAO BAHADUR R. N. MUDHOLKAR —

Gentlemen, the next resolution is to be moved from the chair, but as the president is suffering from asthma, I move it on his behalf, but it is really moved from the Chair.

That this Conference reaffirms resolutions numbers 3, 4, 5, 6, 8, 9, 10, 11 and 13 passed at the last session of the Industrial Conference held in December 1915.

These resolutions were printed and published all over the country. I will only indicate the subjects to which they relate, because several of our friends are anxious to go to the Subjects Committee meeting. The resolutions relate to the development of Indian industries, excise duties, favoured nation treatment indentured labour, Indian students abroad, British Consular service, purchase of stores, cottage industries and industrial Banks.

The resolution was put to the Conference and passed unanimously.

## CONSTITUTION OF THE CONFERENCE

PANDIT VIDYA SAGAR PANDIYA —

Mr President and Gentlemen,—I beg to move the following resolution. It is only formal and about which Mr Mudholkar has already spoken

“ That in regard to the Constitution of the Conference, the draft constitution be circulated among members of the Constitution Committees of 1915 and 1916 and that the opinions of the members be invited thereon by 31st March 1917 and the final draft and report be published not later than 30th September 1917 ”

Dewan Bahadur L A Govindaragava Iyer (Madras) I second the resolution

The resolution was put and carried

### APPOINTMENT OF OFFICE BEARERS

The Hon Pandit Madan Mohan Malaviya.—I beg to move the following resolution —

- “(a) That the following gentlemen do constitute the Standing Committee of the Indian Industrial Conference to advise the Secretaries on all matters and to carry on the work of the Conference.
- (b) That the Hon Rao Bahadur R N. Mudholkar, C I E, and the Hon Mr Manmohandas Ramji be appointed Honorary Joint Secretaries of the Indian Industrial Conference for the year 1917 and Mr. J K Mehta, M A., Honorary Assistant Secretary, and this Conference authorises the Secretaries to appeal to the public for a sum of Rs 8,000 required to carry on the work of the Conference
- (c) That the office of the Conference be located in Bombay

### MEMBERS OF THE COMMITTEE.

1. The Hon'ble Rao Bahadur R N Mudholkar C I E  
(Amraoti)
- 2 The Hon'ble Mr. Manmohandas Ramji (Bombay)



3	Sir Ibrahim Rahimatullah	(Bombay)
4	Sir Vithaldas D Thackersey	do
5	Hon Mr Lallubhai Samaldas	do
6	Dewan Bahadur Govinddas Chaturbhujdas	(Madras)
7.	Mr C. Gopal Menon	do.
8.	Lala Harkishan Lal	(Lahore)
9	The Hon'ble Mr C Y. Chintamani	(Allahabad)
10	The Hon'ble Pandit Madan Mohan Malaviya	do
11	Babu Vikramjit Singh, Secretary Indian Chamber of Commerce, Cawnpore	
12.	The Hon'ble Rai Sitanath Roy Bahadur	(Calcutta)
13	Sir R. N. Mukerjee, K C I. E	do.
14	M S P Bose	do
15	The Hon'ble Mr M. B. Dadabhoy, C. I. E.	(Nagpur)
16	The Hon'ble Rai Purnendu Narain Singh Bahadur	(Bankipur)
17	The Hon'ble Mr Mazhar-ul-Haque	(Bihar).
18	Rao Bahadur Hiranand Khemsingh	(Sindh)

Gentlemen, the matter has been considered by Mr. Mudholkar and other friends co-operating with him and I am sure that you will accept the resolution.

Mr Duni Chand —I beg to second the resolution.

The Hon Mr K. R. V. Krishna Rao (Madras) —I support the resolution.

The resolution was then put and carried.

### VOTE OF THANKS

Mr J. B. Petit (Bombay);—Brother delegates, before we disperse, we have to perform our duty to the chair. On your behalf and my own, I rise to move that a hearty vote of thanks be accorded to the Chairman for his exceedingly able conduct of the chair. I am perfectly certain that you will carry the proposition in a manner indicative of your appreciation of his ability.

Pandit Vidya Sagar Pandya —I wish to second the proposition.

The proposition was carried amidst great acclamation.

The President.—Gentlemen, I thank you for the very flattering and appreciative terms in which you have passed the vote of thanks to me.

### INDIAN MADE PENCILS AND OTHER ARTICLES.

Rao Bahadur R. N. Mudholkar —Before the Conference is dissolved, I am asked to bring to your notice the pencils made by the Professor of Chemistry of the Agra College which, are now here for your inspection They are coloured ones and are as good as, if not superior to, European made pencils Mr Ghullany of Kamptee has exhibited his Asbestos cement, which is already used by several Mills. Glass, Buttons, padlocks &c by Indian Manufacturers are also here for your inspection.

The Conference dissolved after the inspection of these articles.

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PAPERS SUBMITTED  
TO THE  
12th Session of the Industrial Conference  
HELD AT LUCKNOW  
*in Dec. 1916.*

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**Economics of Indian Agriculture and Industry.**

By Mr. KESHAVAL L OZA, M. A.

"Not in vain the distance beckons Forward, forward let us range,  
Let the great world spin for ever down the ringing grooves of change "

"Agriculture," says Gibbon "is the foundation of manufactures, since the productions of nature are the materials of art " From the dim nescience of antiquity until now, the paramount place of agriculture in national economy has seldom been challenged. The life of the husbandman being fed by the bounty of earth and sweetened by the airs of heaven, the scriptures of all nations have justly attributed an almost sacramental position to agriculture Zenda Vesta, for instance, says "He who sows the ground with care and diligence acquires a greater stock of religious merit than he could gain by the repetition of ten thousand prayers " Ancient India exalted agriculture as the noblest field for human endeavour while the Chinese figured national prosperity as a tree, representing agriculture as its roots and manufactures as its branches Shakespeare praised the dignity of labour when he wrote "There are no ancient gentlemen but gardeners, ditchers, and grave-makers: they hold up Adam's profession " Carlyle preached the gospel of work with what Byron would call, "a forty-person power," and said "Blessed is he who has found his work, let him ask no other, blessedness " Ruskin deplored the somnambulism of his age, saying. "Men have to learn that there is no degradation in the hardest manual, or humblest servile, labour, when it is honest ". Unfortunately, men are so constituted as not to suffer ideals to fructify as realities Our Universities flatter themselves with the comforting belief that they are "schools of universal learning",

broad-based on the voice of people And yet, with the noble exception of the University of Bombay, none of them has the strength to fulfil the mission which the needs of our rural population have imposed upon their accredited representatives We are filled with what Watson calls "a large and liberal discontent" and weep the while over the poverty of India, but when the question of recognising the faculty of Agriculture is mooted in our University Senates we are too prone to wobble and wriggle uneasily about, and dismiss the subject with the euphemistic "bally rot" We listen to the Siren voice of the learned professions but are "stone-deaf" to the music of smiling gardens and fields white unto the harvest. Our University types are intensely wedded to the seductive amenities of law, medicine and humanities, and their unseemly scramble for Government service is fraught with ominous potentialities of the South Sea Bubble Our monied classes are mostly "stay-at-homes" who

"Living dully sluggardized at home,  
Wear out their youth in shapeless idleness,"

although the nine Muses exhort them to rise above the dead level of ineptitude

"It was not by vile loitering in ease  
That Greece obtained the brighter palm of art,  
That soft yet ardent Athens learned to please  
To keen the wit, and to sublime the art,  
In all supreme ' complete in every part '  
It was not thence majestic Rome arose,  
And o'er the nations shook her conquering dart,  
*For sluggard's brood the laurel never grows,  
Renown is not the child of indolent repose "*

Agriculture and industry are the outward and visible signs of national prosperity, and the earlier we rectify our past mistakes the better for our country Poverty is not a "heritage of the ages" as we, in our blissful ignorance, believe it to be It has to be cast out as an "old man of the seas" by a telic policy of eliminating exploitation in all its protean forms The object of the present paper is to suggest a scheme of social reconstruction in which health, recreation, a broader education, a fair wage and a decent standard of living will be assured to the toilers in the fields, and in which the varying factors in heredity and environment will be so harmonized that the eradication of pauperism, disease, vice and crime will no longer be achieved by the old method of trial and

error but will become a conscious process, founded on reason and inspired by the hope of final achievement

Dr Harold H Mann, Principal of the Agricultural College, Poona, whose investigations into the problems of poverty are analogous to the sympathetic spade-work of Sir Rider Haggard and Mr Rowntree in England, recently read an interesting paper on the "Economics of a Deccan Village" in which he presented a tenebrous picture of rural distress, which irresistibly recalls to our minds the impressions made on Sir Frederic Treves by India and its people. Sir Frederic speaks of the multitude of men, women and children "a little below the most meagre comfort and a little above the nearest reach of starvation." The country, he says, "looks homeless." It leaves "an impression of poorness and melancholy." "The villages are piteous clusters of mud-walls daubed round the sides of a thick pond in the bare earth." As a result of his searching analysis of the problems of village life in India, Dr Mann comes to the conclusion that the soil requires to be intensively cultivated, extensively irrigated, and systematically manured, if in response to the struggle for existence, growing more and more strenuous every day, the farmer is to "make two blades of grass grow where only one grew before." As it is, ignorance, indebtedness, excessive sub-division of land and want of co-operative organisation make it impossible for the Indian farmer to avail himself of advanced methods of cultivation, while the absence of transport facilities and municipal markets makes it increasingly difficult for him to market bulky and perishable commodities. The result is obvious. India produces 700 lbs. of wheat per acre whereas England with far less genial climate raises 1,700 lbs. of wheat per acre; again, while Germany produces 2,500 lbs. of rice per acre, India straggles in the rear with only 800 lbs. of rice per acre. I am sincerely convinced that if our rural population is to maintain itself in a state of active and progressive prosperity the following reforms are imperatively called for (1) Uniform system of land tenures, (2) a practical scheme of small proprietary holdings, say of five acres each, (3) an amended fiscal system safeguarding the true interests of Indian agriculture and industries against the desolating hand of foreign rivals; (4) consistent State encouragement of general agriculture, private philanthropy co-operating with the Government in providing the necessary capital, machinery and organisation towards the exploitation of the immense natural reso



ures of India, and above all, (5) a revision of the present system of public education so as to bring it in line with the methods pursued in Europe and America to meet the agricultural and industrial needs of the people. Meanwhile, let us return our most sincere thanks to western *savants* like Dr Harold Mann, whose sympathetic "angle of vision" will go a great way towards lightening the gloom which hangs like a pall over the inarticulate peasantry of India.

#### WANTED A FORWARD AGRICULTURAL POLICY.

Upon a careful survey of the present position and future possibilities of agriculture in India, I have come to the following conclusions to which I should like to invite public attention :—

(a) Preparation of annual returns of cropping and live-stock, and institution of agricultural surveys of the different provinces with a view to ascertain whether the physical and chemical properties of the soil are properly utilised for the nutrition of plants and the cultivation of farm crops.

(b) Cultivation of waste lands, either by organising farm colonies, or by letting them as grass runs for stock at a nominal rent. In a famous passage, Pliny describes the fate of Rome's soldiers, who did not own a square foot of land, as worse than that of the wild beasts who have their lair. "It is something," says Juvenal, "to have made oneself master of a single lizard." To obviate this evil, the Canadian Government is reserving twenty million acres of land for soldiers, and lending them £ 100 apiece to defray initial expenditure. There are over a hundred million acres of derelict land in India, and Indian soldiers, who are fighting as gallantly as their Canadian comrades in arms for the glory of the British Empire, are naturally looking forward to a similar recognition of their devoted services.

(c) Organisation of elementary education on an extended scale, supplemented by technical instruction adapted to local requirements in continuation, evening and night schools, jointly financed by the Government and the local boards. Higher education in scientific agriculture should be encouraged by our Universities by recognising the Faculty of Agriculture and by the State endowment for agricultural research. Itinerant lecturers should be appointed, as is done by the French Government, to deliver lectures on agricultural

chemistry and to conduct demonstrations and experiments of agricultural importance on farm institutes established at convenient centres. An ounce of practice is more stimulating than a ton of theory, and the utility of labour-saving appliances, clean seed, cross impregnation, artificial manures and the sequence of crops cannot possibly be more effectively brought home to the cultivator than on model farms scattered broadcast for the purpose. India needs many Robert Elsmers amongst her landed gentry, who should form themselves into an Agricultural Organisation Society to make agriculture attractive as a study and profitable as a profession.

(d) Revision of land tenures with a view to convert tenancies into ownerships wherever practicable. Such a reform will have far-reaching effects inasmuch as it will create a taste for country pursuits, furnish an incentive to the latent powers of industry, patience and efficiency, and will check the portentous exodus from the country to the town. Nothing depresses the farmer so much as the want of fixity of tenure or the dread of increased rent at every revaluation. The partial success of the Small Holdings Act of 1907 in England need not deter us, since freehold tenures have achieved a notable success in Germany, France, Belgium, Sweden, Lombardy, and even in regions which claim no special advantages in the way of soil, climate, markets, common rights or outside labour. To make the village life full, abundant and self-sufficient, we have to create the public opinion against (1) the excessive fragmentation of land which deprives the cultivator of a bare living wage, and (2) the distance between holdings, and the neglect of cottage-building on the farm, involving not only a waste of time but of the richness of farm-yard manure by the volatilization of ammonia, fermentation, and reduction in weight in the process of removal from the homestead to the farm. If we succeed in dotting the country with "economic" holdings with movable cottages attached thereto, as in Denmark, and if we suffer what Young calls, the "magic of property" to have full play, the assiduous labour of the peasant proprietor will turn his estate from a desert into a garden—through irrigation, drainage, subsoil ploughing, manuring, crushing and removal of stones, and planting of fruit-trees—an ideal by no means distant or impracticable in a country where the beneficent action of the tenancy laws would eliminate the objectionable features of "free trade in land" resulting elsewhere in the concentration of

many domains into the hands of merchants, lawyers, and rich townspeople through division by inheritance and increase of mortgages

(e) Application of the co-operative principle to agriculture has relieved the peasant from the haunting incubus of indigence in Russia, Germany, Austria, France, Poland, Ireland, Servia and Roumania. In England and India, the ideal beautifully embedded in the motto "each for all, and all for each" has not yet percolated the conservative masses to an extent calculated to satisfy its ardent advocates. In this respect Russia is "daily self-surpassed," and has broken all past records with its 35,000 co-operative societies against Germany's 1,700 co-operative credit banks, and with its co-operative membership of 12,000,000 against India's 750,000 co-operative members enrolled in *eleven* years. This is the reason why, in respect of education, irrigation and facile credit, the Indian peasant, like Oliver Twist, "asks for more." At present, he has sufficient reason to lay to heart what an Italian writer has pithily said "The poor man obtains no credit because he is poor, and he remains poor because he has no credit." And yet even Ananias himself would find it hard to deny that the future is big with hope, in view of the laudable zeal evinced by the Government to relieve the wretchedness of him whom Lord Curzon has happily described as "the bone and sinew of the country."

#### DEVELOPMENT OF NASCENT INDUSTRIES.

It is admitted on all hands that to discredit the fossilized remains of prehistoric antiquity in the domain either of agriculture or industry, the one thing needful is *Educate, educate and always educate*, for the simple reason stated long ago by Andrew Marvell.

"How much one man can do  
If he both act—and know?"

All over the Continent of Europe the technical and commercial schools have been organized, and the education they provide is most carefully thought out by the Government acting in co-operation with merchants and employers, with the result that the education provided is not only direct and scientific, specialised with a view to different occupations, but there is a causal relation between the machinery of education and commercial prosperity, as in Germany, for instance. Thanks to the tendency to cohesion fostered by the ideal structure of the village community and the joint-family system, India has so far successfully mitigated the harshness of the industrial revolution.

which broods over many a hearth in Europe and America The growing discrepancy between productive and purchasing power and the resultant extremes of wealth and poverty called forth the following admonition from an American Fabian

“Instead of exulting in the fact that she gives £6,000,000 a year ‘to the poor,’ New York must hide her head in shame that she has so many poor to give to What sort of an economic system is this which works so badly that £6,000,000 a year will scantily serve to patch it up to keep it going? Is this peace or is it war which requires a city to expend £6,000,000 a year in the gathering up and caring for part of the crushed, the distressed, the mangled, and the disabled of its citizens?”

“A really intelligent community would as soon think of boasting of its epidemics and diseases as of its expenditure for ‘the poor’—would as soon vaunt itself on the length of its death-list as upon the magnitude of its charities Pompous rehearsals of the sums given ‘for sweet charity’ are to be sighed over rather than rejoiced in”

To guard India against a fate so terrible, the Government of India has been giving its most anxious thought to the problems of land, labour and industrial enterprise, and the Holland Commission has been specially appointed to collect facts, figures and economic data, and to suggest measures for the amelioration of land and of those who work it, of the towns and their trade, and of our industries, both large and small A great deal of leeway shall have to be made good and the defunct economic solution based on the “materialistic interpretation of history” offered by Karl Marx shall have to yield place to a new gospel in which racial, economic and educational factors are duly emphasized The “patient, humble, silent millions” (to quote Lord Curzon’s expressive phrase,) of peasants shall then be reclaimed from the “slough of despondency,” and the fiscal policy so framed as to afford India’s merchant-princes the greatest possible facilities for the development of indigenous industries

I shall now pass in rapid review the methods and conditions of industry prevailing in India, and compare and contrast them with those of other countries The survey does not profess to be comprehensive, but embodies a series of suggestions and rather tentative ones at that intended to stimulate inquiry rather than gratifying it,

## (1) THE COTTON INDUSTRY

The labours of Liebig, Lawes and others in agricultural chemistry have not affected the Indian farmer to any appreciable extent, and he is still proceeding—with varying success—by the “rule of thumb” and ancestral traditions. “Earth is here so kind, that just tickle her with a hoe and she laughs with a harvest,” remarks Douglas Jerrold in praise of the Australian soil, and although we are gifted with the same, if not greater, natural advantages, we are like the man in the old parable, who failed to use well the talents, entrusted to him and hid them away in a napkin. The United States, accordingly, produces the largest cotton-crop, and meets seventy-five per cent of the world’s demand. In strength of fibre, in quality and in ginning outturn, the American cotton remains unsurpassed while the yield per acre is *thrice* that of India. Given greater facilities, the cotton crop of India is capable of bringing back happy self-sufficiency to India, and of diminishing, in some measure, the agricultural indebtedness by enabling the people to re-capture the principal markets of the world. To save ocean freights we should, like Japan, organise a mercantile fleet of our own. Again, there is no reason in the nature of things why we should annually export cotton-seeds worth about 2,500 lakhs of rupees when, with a small outlay of capital, they can be pressed here to obtain oil, which serves as a substitute for olive-oil, and is used as an ingredient in the manufacture of soap, candles, and phonograph records. Similarly, cotton-stalks can be utilised for making paper after they are cut and ground, boiled and bleached. Oil-cakes are traditionally used for fattening bullocks and dairy-cows. They are used in Mysore to replenish the soil for sugar-cane cultivation with excellent results. We have hitherto neglected linseed-cake which, if given in moderate quantities, is by far the best stock-food of its kind, while its jelly might be used with advantage by the sick and convalescent.

## (2) THE SILK INDUSTRY

Our imports both of raw silk and silk fabrics exceed our exports by some lakh of rupees every year, although it is possible to develop sericulture in Bengal, Assam, the Central Provinces and Kashmir by adopting proper methods of rearing, hatching and reeling. Eri silk produced by the larva of *Attacus ricini*, which feeds on the leaves of the castor plant might be cultivated in Assam and elsewhere as a cottage industry. We watch with considerable interest the

experimental work in this direction undertaken by the Salvation Army in the Punjab Silk worm raising affords a healthy occupation to women in Queensland while in the West Indies the industry is fostered by definite instruction—a plan well worthy of adoption in India

In this connection, it is necessary to point out that our hand-loom weavers need encouragement Mr Havell estimates that there are four million hand-loom in Bengal alone, and he assures us that if we spend ten rupees apiece and adopt improved methods, the net profit will be doubled. Besides giving employment to several persons of both sexes, hand-loom weaving will turn out articles of finer texture than those turned out by our mills, in which the quality of the output has not in some cases kept pace with the quantity, but shows signs of positive deterioration every year In point of durability our piece-goods compare unfavourably with the products of Lancashire mills, which have remained uniformly excellent, whatever the cost To the same cause may be attributed the success, in the past, of the gossamer muslins of Dacca, beautiful shawls of Kashmir and the brocaded silks of Delhi “To sell an unsound horse for a sound price’ is a policy so insufferably vulgar and so completely foreign to our tradition that nothing short of eternal vigilance over the quality of the raw material and over the whole process of manufacture will consolidate the good will of our business.

### (3) THE SUGAR INDUSTRY

Our wasteful methods of cultivation and manufacture are nowhere so greatly in evidence as in the vast and most remunerative sugar industry, nowhere is the application of capital, enterprise and trained skill more imperatively called for Sugar-cane can flourish in a calcareous marly soil—a type very rare in India Accordingly, notwithstanding fairly good supply of water and cheap labour in India, sugar-cane yields nearly two tons less sugar per acre than it does in America, whilst the cost of production per ton is ten rupees in India again seven rupees, eight annas in Java If, therefore, the sugar industry is to be made self-supporting, irrigation facilities have to be extended, potassic manures have to be offered at concession rates, and the mendelian principles have to be diligently applied to sugar-cane cultivation India might be saved from the appalling drain of ten million pound sterling at present expended every year on foreign bounty-fed sugar, and might besides be placed in a posi-

tion to cope with the British demand if experimental, educational and financial assistance be rendered by the Government to sugar factories and refineries in our midst, and the policy of "the open door" of commerce be abandoned. The cultivators should be induced not to sell sugar-cane to retail-dealers but to convert it into *gur* which fetches a higher price. The sugar of commerce can also be obtained from sugar-beet derived by selection and by systematic breeding from the sea-beet. Five million acres are now devoted to the world's crop in other lands. We look forward to the results of experiments with this important sugar-yielding fieldcrop at Peshawar to ascertain whether the crop can be satisfactorily grown in India.

#### 4 THE TEXTILE INDUSTRY.

The cultivation of flax and fibrous products other than jute for the making of linen, paper and cloth has fallen into desuetude in India for want of capital, initiative and state aid, but mainly because of foreign competition. The value of animal fibres, derived from the camel, the cow and the shell-fish, in the manufacture of cloth is not fully appreciated in India. The textile industries are markedly subject to fluctuations in demand due to the alternations of war and peace, and to the vagaries of foreign tariffs. One has only to follow the fortunes of the jute trade of Dundee during and after the South African and the Japanese Wars to see how a boom is followed by a slump, how manufacturers are squeezed between high costs and low demand when, as in 1908 and 1910, the scarcity of jute is accompanied by a scarcity of some of its leading clients, such as cotton, wheat or coffee. With regard to the production of jute, as of lac, India holds a virtual monopoly, since attempts to acclimatise it in Egypt and other parts of Africa have partially failed. Jute requires a hot, moist atmosphere, where there is considerable rainfall, and amply repays through cultivation and effective manuring. It is in the highest degree desirable to extend the area under jute as under cotton so that jute and cotton might contribute their quota towards the relief of the rural population. Jute is used to make "gunny" bags, rugs, and even wearing apparel, and when mixed with other animal and vegetable fibres, jute provides horse cloth, tapestries, paddings, household cloths, etc. The jute trade richly deserves any help that the State or private enterprise might offer.

The Plantain-Fibre Industry has been consigned to an unmerited limbo of oblivion, and clamours for redemption. The roots of the

plantain-plant are of great value in pulp-making, its dry leaves yield potash, its juice is serviceable in preparing a dye which can be employed in leather industry, while the plantain-fibres are utilised by the plucky Japanese in the manufacture of a kind of cloth which rivals with silk and alpaca in beauty and delicacy. This industry was once in a flourishing condition in India, and cordage, canvas and paper manufactured from the plantain-fibres were shown by Dr Hunter of Madras to admiring crowds at an Exhibition held in England in 1851. Given an outlay of about ten thousand rupees, the plantain-fibre industry will, according to Mr Banerjee's modest estimate, yield a net profit of two hundred rupees on every hundred. There are over three hundred fibre-yielding plants in India, which can be used in the manufacture of paper, cloth and carpets. Thus, pine-apple plants grow in abundance in the Deccan, but for want of adequate transport facilities the inhabitants of the Konkan are defrauded of the splendid possibilities which the manufacture of pina cloth from the fibres of the leaves of the pine-apple plant would open to them. The natives of the Philippine Islands prepare pina cloth, a yellowish fabric of delicate texture, which can be most beautifully embroidered.

## 5. MINOR INDUSTRIES.

We have not awakened to a realisation that the industries connected with horticulture, floriculture, forestry, and pastoral, dairy and poultry farming can be turned to glorious gain, by promoting co-operative purchase, co-operative production and co-operative stores. It is well-known how the "*cornices agricoles*" in Belgium, and the farmers' syndicates in France have given an impulse to the extension of the arable area and to the cultivation of remunerative crops. By the joint action of agricultural boards, agricultural schools, loan banks, granaries, dairies and cattle insurance, the German agriculturist attains a more intensive cultivation, a better assorted production, and better marketing qualities for international trade than his *confrere* in England or France. The transformation of Indian agriculture will be only a question of time when the Indian peasant becomes a scientific and specialised producer, and handles "*industries agricoles*" to perfection.

Regarding poultry-farming, the author of "*Commercial Egg-Farming*" says from his own experience in Canada and England that it is possible to realise a profit of £150 in the second year, and £300



in the third year on an investment of £1,000, apart from a house, outbuildings, and eight or ten acres of land. Besides, poultry manure is "a much more concentrated fertilizer than the best farm-yard manure," and when properly stored in a dry place it yields one shilling per bird every year. Most encouraging results would be obtained if this industry as well as dairy farming were co-operatively organised on the Danish model. Co-operative dairying would ensure a regular supply of pure milk as the animals will be better fed, better groomed and better housed than at present. At a time when artificial feeding of infants is rapidly replacing breast-feeding the importance of affording all classes of people facilities for obtaining clean unadulterated milk can hardly be exaggerated. If the social conscience is once awakened, co-operative dairies would give rise to dairy factories which, in Europe and America, serve as "economic safety-valves" to the milk trade. The Government should encourage this industry by providing technical instruction in dairy-farming as in Canada, and by arranging with the railway authorities to keep down the cost of transit, and to construct further lines in the way most likely to suit agricultural transport, as in Denmark. Sanitary and financial aspects apart, the value of *esprit de corps* fostered by co-operative dairying is incalculable. Says the author of "Co-operation at Home and Abroad"

"The co-operative dairy is a peculiarly suitable medium of instruction and if, as is the case in Europe, Governments are determined to spend money on the technical instruction of the farmer, they cannot do better than use the co-operative dairy or its equivalents. For the organisation is already there, testing and improving, and being self-created it commands an amount of confidence, which is essential to successful instruction and which government institutions, imposed from above, strive in vain to win. So long as governmental assistance is supplementary and indirect—demonstrations, shows free inspection and grants in and of model appliances, rather than outright bonuses to the agriculturists—the co-operative society can make itself the ally of the Government without serious apprehension of damaging its spirit of independence."

Other minor industries which would prove a source of profit to the agriculturist are those connected with the manufacture of leather lace, dyes, toys and wax. Bee-keeping, for instance, is perfected in America so much so that the average yield of honey has increased

from 40 lbs to as many as 400 lbs from a single hive. The industry gives employment to women in Jamaica whose exports of honey and bees'-wax amount to £15,000 a year. In places rich in fruit-trees like Mahabaleshwar, Matheran, etc. bee-keeping bids fair to prove a thriving industry, provided the Government undertakes systematic training on lines adopted elsewhere, in the west Indies, for example. Both honey and bees'-wax are largely used in medicine. Unani and Ayurvedic drugs are every frequently taken with honey, while bees'-wax is sometimes given internally as a protective to the gastric and intestinal surfaces, in addition to its use as a basis for ointments and plasters on account of its non-irritating quality. Experiments at Pusa will, in due course, establish the use of bees'-wax for making candles, modelling or casting ornaments or effigies, and for polishing floors and furniture.

### THE LABOUR PROBLEM IN INDIA

It is the crowning glory of the organization of Indian society that the labour problem has not yet presented the disgusting features which in Europe and America not infrequently find expression in "sabotage." Yet it does not require much penetration to envisage a condition of things which the impact of the West upon the East will bring within the next few years, when the industrial revolution will have spread its roots far and wide in our land. Hence the necessity of teleic prevision in national policy. The best thought and keenest energy of our statesmen should be directed to the task of reducing social friction and waste to a minimum by wisdom in legislation and education. Lord Curzon realised that ignorant, unskilled proletariat is a real drag to material prosperity, the root-cause of vice, pauperism and crime. At an educational conference held in 1901 at Simla, he said among other things

"It cannot be a right thing that three out of every four country villages should still be without a school, and that not much more than three million boys of school going age should be in receipt of primary education. . . What is the greatest danger in India? What is the source of suspicion, superstition, outbreaks, crime, yes, and also of much of the agrarian discontent and suffering among the masses? It is ignorance. And what is the only antidote to ignorance? knowledge. In proportion as we teach the masses, so shall we make their lot happier, and in proportion as they are happier so will they become more useful members of the body politic."

Society should accordingly repudiate the slow and tortuous movement of genetic development, and with the active assistance of the Government embark upon a vigorous teleic policy of diffusing general and scientific education in schools and Colleges, eked out in laboratories and factories, in libraries, art centres, in private study and in great correspondence schools. It must be borne in mind that the expense of general education will be a dead loss to the nation unless it is preceded by improved economic conditions enabling the working class parents to keep their heads above water till their children acquire the requisite agricultural or industrial training in continuation schools, technical classes and national universities assisted by scientific bureaux and commissions of research. Improvement in the economic position of the masses depends upon the alacrity with which the Government and the public set about the rehabilitation of handicrafts and domestic industries in our villages. The growing rural depopulation can likewise be prevented by providing farm colonies—an experiment which was so successfully tried in Holland more than sixty-five years ago. When farming operations are slack we might broaden the outlook of villagers by providing social and intellectual amenities in the form of lectures with or without lantern illustrations, bringing out the importance of hygiene, sanitation and domestic economy in daily life.

It is however in our city slums and rookeries that the victims of the Juggernaut Car of the Industrial Revolution may be counted by tens of thousands. The machine industry and the world commerce have consigned the working class population to the tender mercies of the large capitalists who have monopolized great industries, patents, franchises or the necessities of life or business. The insufficient purchasing power of the workers, the monopolization of the already inadequate means of exchange, the rise in land values, rent, prices and interest have reduced wages to a wretched pittance and created a whole army of the unemployed. If India is to be saved from acute financial and commercial crisis, increased opportunities should be offered to her teeming millions to exploit her immense agricultural and industrial resources and to eliminate all waste of power through obsolete methods, through deficient organisation of production and distribution and through superfluous middlemen. General education, cheap capital, unrestricted coinage of silver, protective tariffs and expert information about trade, commerce and market conditions similar to that embodied in American

consular reports are some of the directions in which the Government might help in shaping the future of Indian industries. The problem of unemployment can be simplified by the Government (1) devising some means (afforestation, labour colonies, etc.,) for the absorption and utilization of surplus labour, (2) encouraging the formation of municipal labour bureaus to relax the tension between capital and labour, of industrial partnership of employer and employed resting, not on the mutable basis of mere salaries and wages, but on the solid bedrock of the profits on capital, of joint responsibility and management and of apprenticeship societies to enable the worker to acquire an all-round training in his prospective occupation by means of financial aid during his novitiate, and (3) pressing the scientific manager, the psychologist and the bio-psychologist into the service of industry. America and Germany have organised courses of instruction in scientific management in business colleges. Mr J. A. Hobson points out how by getting the right man to use the right tools in the right way, scientific management has made for shorter hours, higher wages and adequate facilities for education and recreation, how the psychological inquiry into the vocational needs and the personal ability of each employee has made it possible to find the best possible man, to produce the best possible work and to secure the best possible effects, how, with the assistance of the bio-psychologist, the scientific manager "would discover and prescribe the precise combination of foods, the most hygienic clothing and housing, the most appropriate recreations and the 'best books' for each class, with a view to the productive efficiency of its members. He would encourage by bonuses, eugenic and discourage by fines dysgenic marriages among his employees. So far as intelligent employers are in a position to determine or to influence the expenditure of the wages they pay and the general conduct of the lives of their employees outside the working hours, they are disposed to practise this policy." If the employers of labour in India take into account the human scientific calculus of industrial values by building sanitary dwellings for their employees, by discouraging "brainless expenditure" on foolish frivolities, by discarding the heretical notion of the "iron law" of wages and by regulating the scale of wages in accordance with the phenomenal rise in prices and with the ever-advancing productivity of labour, the wage earners will enjoy all the blessings which temperance, sanitation, hygiene, educational and recreative opportunities confer upon man. Meanwhile, some working scheme of state insurance to protect the workers against

unforeseen mishaps and Ruskin's suggestions for their betterment might find tentative expression in legislation Ruskin maintained :

- (1) That training schools be established to teach young men and women three things —the laws and practice of health, habits of gentleness and justice, and the trade or calling by which they are to live
- (2) That the Government establish farms and workshops for the production of all the necessaries of life, where only good and honest work shall be tolerated and where a standard of work and wages shall be maintained
- (3) That any person out of employment shall be received at the nearest Government school if ignorant, he shall be educated, and if competent to do any work he shall have the opportunity to do it
- (4) That comfortable homes be provided for the sick and for the aged, and that this be done in justice, not in charity A labourer serves his country as truly as does a soldier or a statesman and a pension should be no more disgraceful in one case than in the other

The above programme is by no means ambitious when viewed in conjunction with the varied activities of the State in England to ensure equalisation of opportunities for individual development In consequence of a new spirit of humanity and philanthropy breathed into British legislation by the Wesleyan Revival, the State provides nursing, and education and medical attendance It opens art galleries, museums, libraries and concert halls, it licenses, inspects and regulates a large number of industries, factories, companies, charities, trades and occupations. To quote Mr Sidney Webb —

“ The inspection is often detailed, and rigidly enforced The State, in most of the larger industrial operations, prescribes the age of the worker, the hours of work, the amount of air, light, cubic space, heat, lavatory accommodation, holidays, and meal-times, where, when and how wages shall be paid, how machinery, stair case, lift-holes, mines and quarries are to be fenced and guarded, how and when the plant shall be cleaned, repaired and-worked Even the kind of package in which some articles shall be sold is duly prescribed, so that the individual capitalists shall take no advantage of his position. On every side he is being registered,

inspected, controlled, and eventually superseded by the community, and in the meantime he is compelled to cede for public purposes an ever-increasing share of his rent and interest ”

Given conservative adaptation of these measures to Indian conditions, with proper safeguards against the evils of officialism, jobbery and corruption, the labour problem in India will be solved without friction incidental to transition from static to dynamic civilisation. Once the dull level of apathy is removed by the provision of harmless pleasures, refined enjoyment and progressive interests in parks, gymnasia, reading rooms, libraries and social centres, the unskilled labour will become skilled and the skilled become scientific eventually leading to economic salvation. The State should encourage investigations like those carried on in England by Mr Charles Booth, so that the phenomena of health might be determined from the study of life insurance annuities and reversions. We want a quinquennial census and a permanent staff, tabulation of market-prices of staple commodities, returns of railway traffic similar to that by water, and a record of factory production, enabling us to ascertain how many persons are dependent on each particular industry. We would likewise welcome a careful analysis of the conditions of labour, like that made by Dr Farr and Caspar of Berlin with a view of determining, the extent to which the duration of life is affected by the circumstances in which male and female labour is exploited in different occupations. No country can lay claim to true progress unless and until it has made nourishing foods, sanitary conditions of housing and labour and relaxation from mental strain as easily available as “the bright and the balmy effulgence of morn ’ to the flotsam and jetsam of its population.

### A VISION OF THE FUTURE.

In spite of back-eddies so numerous in human affairs, I am sincerely convinced that the world is advancing and it behoves every one, as Goethe says, to move, like a star, restless but hasteless in his own sphere. “Let us allow and believe,” wrote Wordsworth, “that there is a progress in the species towards unattainable perfection, or whether this be so or not, that it is a necessity of a good and gifted nature to believe in it.” Several writers have formulated different “crescent variables” of human progress which afford us ample food for reflection. Mill saw the social panacea in

the growth of representative institutions, Hegel in the development of reason, Matthew Arnold in diffusion of "culture" while Emerson emphasized education "in the widest commonality spread," saying

"Let us make our education brave and preventive, politics is an after-work, a poor patching We are always a little late The evil as done, the law is past and we begin the uphill agitation for the repeal of that of which we ought to have prevented the enacting We shall one day learn to supersede politics by education What we call our root—and branch reforms of slavery war, gambling intemperance is only medicating the symptoms We must begin higher up—namely, in education "

If India is to take her rightful place in the family of nations, we must straightway apply the sovereign remedies *viz.*, improved economic conditions and general education As long as in our psychological privacies we look upon the "submerged tenth," as Varro did, as little better than "vocal agricultural implements," and harbour an almost Aristotelian contempt for "mechanics," all hope of reform is but a *fata morgana* of the heart. Of all cant the naive assumption that the proletariat disbelieves in education is the most mischievous as it induces a condition of bitter resentment or degrading acquiescence, either of which spells disaster Another exploded platitude which betrays a sad lack of historical perspective is to exhort India to rest content with the development of her agricultural resources, although the whole world is a witness to the national decadence of Poland through her sole reliance on agriculture to the exclusion of manufacturing industries. It is no use trotting out the heresy of the mercantilists that a country should possess its soul in patience if the balance of trade is in its favour, that is to say, if her exports exceed her imports, as is actually the case with India. The position that all imports are paid for by the exports, (or what Jean Baptiste Say proclaimed *viz.*, that commodities are paid for with commodities) is economically unsound if the things we import provide a profit to the foreigner, while the things we export leave us no profit, not to mention the enormous ocean freights when the raw materials are exported in foreign "bottoms" It will help us to visualise the growing indebtedness of India if we pause and consider the debts of the state the public bodies and the private enterprise to the people of other countries, and the amount

of yearly interest on these debts Witness the effect of passive balance sheets on Portugal, which had to pay quite an appalling sum of money by way of interest, rent, royalties, profits, dividends, etc., to the British capitalists as the first fruits of the Methuen Treaty, which ultimately brought about the complete ruin of the Portuguese woollen factories as inevitably as the later Eden Treaty with France and the cessation of the Continental System in Germany crushed the growing industries of the countries concerned We have likewise to take a leaf from the history of the American trade combines and their tactics of ruining the infant industries of a country by offering their goods at a ridiculously low figure These are some of the reasons why India demands fiscal freedom to arrange her tariffs according to her industrial requirements, and wistfully looks up to the Government to retrench public expenditure and to invest her spare cash and floating reserves in the interests of her agriculture and industries

Our present system of education should likewise be revised in the light of past experience and future issues Sir Arthur Evans made some very pertinent remarks in his recent presidential address to the British Association, which deserve our serious consideration He said —

“It is a lamentable fact that beyond any nation of the West the bulk of our people remains sunk not in comparative ignorance only—for that is less difficult to overcome—but in intellectual apathy. The dull incuria of the parents is reflected in the children, and the desire for the acquirement of knowledge in our schools and colleges is appreciably less than elsewhere. So, too, with the scientific side of education, it is not so much the actual amount of science taught that is in question—insufficient as that is—as the instillation of the scientific spirit itself—the perception of method, the sacred thirst for investigation ”

The reason for this “incuria” is indicated by one of Bernard Shaw’s characters “The last thing that an Englishman likes to be called is intellectual.” One thing is certain If such a clarion call is needed in England, one does not require the aid of Sam Weller’s “patent, double million, magnifying gas microscopes” to discover the want of scientific temperament in India plunged as she is in the Cimmerian darkness of ignorance Here, if anywhere, is the necessity of free and compulsory primary education so im-



perious. The pitiless pressure of competition loudly calls for this "foundation" education to be supplemented in continuation, evening and technical classes and brought in touch with actuality in workshops, technical institutes, science and art museums, gardens, fields, laundries, kitchens, etc. If India is not to be side-tracked in the race for progress, her plodding and drudging millions should be endowed with capacity, prudence and enterprise by making the manual and mental labour material for physiological and psychological investigations. Under the implacable Darwinian law of the "survival of the fittest," a nation is bound to succumb which has made its schools into what Comenius calls "the terror of boys and the slaughter-houses of minds" and has not adapted its professional and technical instruction of university rank to the demands of practical life. The time has come when the undue emphasis on linguistics should make room for the achievemental ideas of higher civilization. The success of Germany as a commercial nation is mainly due to the formation throughout the kingdom of classes in technology and to the application of science to different trades. The main principles of German technical education consist (1) in giving the highest possible scientific training to all those who are likely to occupy any of the higher posts in industrial works; (2) in imparting, either gratuitously or at a very small cost, sound general and practical education to artisans and workpeople, (3) in providing cheap secondary education for all persons qualified to receive it. Humboldt says that "the end of Government is the development of man in the greatest originality and variety possible." Accordingly, India expects her Government to promote professional commercial, engineering and agricultural trading schools, to give generalized instruction in the use of tools, and special instruction in the artistic industries and finally to enrich and beautify life by achievements in literature science art and philosophy. When our girls receive systematic instruction in domestic economy in schools, and information concerning the peculiarities, duties, responsibilities, and dangers of sex from their mothers, they will have small reason to complain with medea in Euripides "Of all beings born to life and intelligence we women are the most unhappy." These ideals will be easy of attainment if the Government receives the necessary co-operation on the part of the public as a whole. Remarking on the inability of Charlemagne to found a university Cardinal Newman said —

“Benefactors and patrons may supply the framework of a *Studium Generale*, but there must be a popular interest and sympathy, a spontaneous co-operation of the many, the concurrence of genius, and a spreading thirst for knowledge, if it is to live. Centuries passed before these conditions were supplied, and then at length, about the year 1200, a remarkable intellectual movement took place in Christendom, and to it must be ascribed the development of Universities ”

Bombay has taken the lead of the Universities in acknowledging the necessity for giving agricultural and commercial education special recognition. The Sydenham College of Commerce and Economics provides, like the London School of Economics, specialised instruction in currency and banking, international trade and foreign exchange, economic geography, commercial history, higher accountancy and actuarial science. Our progress will be assured as soon as other Universities follow the noble example of the University of Bombay, and organise courses of lectures on the history and development of trade and tariffs, on economic science and statistical science, mercantile law, international law and commercial geography. Finally, India wants the Government and enlightened philanthropy to multiply Institutes of Technology with special departments for mining and metallurgy, naval architecture and marine engineering, railway engineering and hydraulics, electric traction and power transmission, electro-chemistry, optics and various branches of chemical technology and applications of biology. Thanks to men of broad human sympathies who adorn the syndicate of the University of Bombay, Bombay will steal a march over other Indian Universities by inaugurating sociological studies on the initiative of Principal Percy Anstey of the Sydenham College of Commerce and Economics. The aim in science and the policy in education of such a “social survey for social service” ought to be on the following lines laid down by Professor Geddes in his fascinating volume entitled “City Development.”

“1. Sociology, like all other sciences, must be based on actual observations, methodically made, systematically arranged and generalised by the aid of verifiable hypotheses.

2. The student’s observations may best begin with field investigation of the facts of his own region, and for this he must utilise the resources of the preliminary sciences, commencing with those of

geography, passing on through the physical and the biological sciences, and finally calling in the aid of the several social specialisms, economics and other. From this "regional survey" of his immediate environment the student passes on to a comparative study of his own and other regional units, of city and province, nation and empire, language and civilisation, till the expanding area of observation and study covers the globe.

3 Observation of contemporary social phenomena soon leads to the recognition of changes, especially when based on the comparative study of region by region. To interpret these current events the resources of historical specialisms and the general history of civilisation have alike to be utilised, contemporary social phenomena being largely survivals and recapitulations of past historical developments. But while preliminary studies in geography begin with a survey of a particular region and ascend to a general view of the world-theatre of mankind, the corresponding historical preparation of the sociologist essentially proceeds in the reverse order, the student using the general history of mankind to interpret the particular history of his own region. Its industry and art, its politics and religion, its education and custom being thus viewed as parts of a general evolutionary process, the possibilities of its modification by conscious human endeavour next present themselves to the student who thus passes by a natural transition from pure to applied sociology, from science to art, from social survey to social service. From this point of view, every individual type, every social institution, industrial and political, educational and religious, is seen as an empirical racial experiment towards a certain social ideal, though this may be but obscurely known to the participating individuals. Given, however, such evolutionary ideals, the transition from empirical to rational (*i. e.*, scientific) experiment in social evolution is inevitable. The history of every branch of science shows at a certain stage of its development the emergence, not only of observational but of experimental institutes, in fact laboratories, in which the conditions of rational experiment are thought out and organised."

In concluding this survey, I cannot help sounding a note of warning. While reaching out too eagerly for the seductive charms of material civilisation, let us see to it that our civic and social virtues do not die of inanition. When once the minds of our young

men are no whit better than "the disused rabbit-warrens of other people's opinions and prejudices" degeneracy is inevitable In proportion as we enable them to sport into fresh varieties so will our progress be sure Meanwhile, let us "read, mark, learn and inwardly digest" the following words addressed by a Western *savant* to his compatriots under the upas-blight of what Herbart calls "didactic materialism" due the defectiveness and insufficiency of cultural teaching and idealism —

"Idealism can save us from the profound fallacy that organisation is an end in itself or that machinery will save a people We are perhaps too apt to believe in the strength of organisation and to overlook its essential weakness It would be a sordid boon to barter away for the sake of machinery those spiritual initiatives on which all human progress ultimately depends."

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# Sugar Problem in India

## with special reference to the U. P.

By R. R. SANGHI, Esqr Sugar Chemist, U P Govt., Cawnpore.

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The writer has ventured to submit his views on the above subject in response to a letter received from the General Secretary of the Indian Industrial Conference. His knowledge and experience are very limited and the ideas put forth herein may not be commendable to experts and those who are authorities on the subject. He humbly submits that all corrections will be quite welcome to him.

As the Bulletin of the Imperial Institute, London, puts it in one of its recent issues, India, no doubt, is one of the greatest sugar (mostly Gur) producing countries in the world. Not only is it a great producer but also a very great consumer of the commodity. The History of Sugar (vide Prinzen Grashig's Cane Sugar Industry, past and present), says that Indians grew, manufactured and used sugar at a time, when the rest of the world did not even know its name. Of course, the sugar produced was nothing but concentrated cane juice. As pointed out by Mr Clarke, in his review of the above book, Saracens most probably took the sugar cane from India and introduced it into some parts of Central Asia. Among the Europeans, the Crusaders were the first to find it on the shores of the Levant and it was introduced into Spain as early as 750 A D. Such being the case, it is, of course, deplorable that today, India looks up to others for an extra supply of sugar over and above her own production to meet the daily increasing demand of her sons for this article of food.

The total annual production of British India is roughly 81,750,000 maunds of Raw Sugar or Gur, out of which a nominal quantity of about 436,000 maunds is exported annually to Ceylon and the United Kingdom; while we have to import 21,800,000 maunds of Sugar more from Austro-Hungary, Java and Mauritius in order to meet the home demand. The annual cost of this imported sugar comes to the enormous figure of Rs. 150,000,000, which is worth consideration.

The question naturally arises whether the surplus sugar required by India can be manufactured in the country and at a price which may shut out foreign intrusion

The acreage under cane in India, is at present, about 2,500,000 as forecasted in the beginning of this year, the actual figures in 1913-14 being 2,541,552 acres. About 55 % of this area is in the United Provinces, where, in 1913-14 1,389,347 acres were under cane. Of course, a good season in India means an addition of about a lac of acres to these figures and a bad one a diminution of an equal area. Even this enormous area is found insufficient to meet the Indian demand and if the sugar outturn per acre remains where it is to-day, an additional cultivation of 600,000 acres is required to make up the deficit.

It is a curious fact that though the area under cane has been steadily increasing in India, having risen from 2,184,000 in 1909 to 2,500,000 in 1914, the import of sugar has also been increasing by leaps and bounds. The following figures furnish an interesting study —

Year	Imports in maunds
1871-72	766,448
1891-92	3,645,727
1906-07	15,129,254
1909-10	17,180,939
1913-14	24,437,280

From 1898-1903 the German and Austrian Beet sugar flooded the Indian market, owing to the much talked of bounty system, which enabled the manufacturers to export this sugar at below the cost price. But since the Brussels convention of 1902, Java and Mauritius Sugar began to replace it gradually, so much so, that in 1909-10, out of total import of 17,180,939 mds, Java alone, supplied 10,637,746 mds and Mauritius 4,031,910 mds. But, now since the outbreak of the war, the means of transport being not so easy and cheap as in normal times, these imports have been greatly reduced and the new tax levied on the imported sugar has also acted as a hindrance in their way. The consequence has been that the price of sugar has gone up enormously to about double that in normal times. Is this, gentlemen, a satisfactory state of things?

If the enormous area which is under cane in India had been situated in any enterprising and scientific country, she would have

not only supplied her own wants from it, but would also have been able to export a fair amount. The fact is that we do not require an additional 600,000 acres under cane, but that we require enterprise and science to come to our aid in order to bear out the truth of the above statement. In the Wynne Sayer's words, it is calculated that the amount of sugar burnt in megasse as fuel and the loss of sugar from direct heating over the fire is nearly equal to India's imports.

The first and the most unfortunate thing in our country, especially in the United Provinces, is the low produce of cane which is only about 200 to 300 mds. per acre on an average in the case of thin canes and 400 mds. in the case of Pounda or thick canes. In some parts of India, such as Bombay, Madras, Central provinces and Bengal, which lie in the so called "Sugar belt", the produce sometimes reaches to from 600 to 700 mds. per acre. It is very often urged that the climate of the parts giving a low produce is not suited to cane growing and that only the area under cane in the sugar belt should be increased, the other parts being given up as hopeless for cane cultivation. This is, no doubt, right to a certain extent, but there are other equally important considerations, to be taken into account before deciding upon a radical change of this nature. There was a strong repetition of the plea in the 'Commerce' of 4th May 1916, echoed by the International Sugar Journal for June 1916 and the policy of the Agricultural department of the Government of India was strongly criticised. An effective reply to that has been published in the October issue of the 'Agricultural journal of India' by Mr Wynne Sayer, B A Assistant to the Agr. Adviser to the Government of India. The chief points emphasised by Mr. Wynne Sayer are —

(1) Enormous sugar and Gur consumption in India, which finds even the present area under cane insufficient.

(2) Keen competition of other crops in the so called sugar belt, such as jute in Bengal, indigo in Behar, and paddy in general, which are more profitable to the cultivator and so make it impossible to increase the area under cane in these places.

(3) Poverty of cultivators in the U P and other places outside the sugar belt, who specially choose sugar cane as the most paying crop in face of the fact that the produce is so low.

(4) Scarcity of water in the sugar belt, which also prevents the increase of area under cane in those parts

This clearly shows that we cannot do away with cane cultivation in the provinces outside the sugar belt, and United Provinces is the most important of them. The question now is how to increase the outturn of these parts. It will find an easy solution in the growing of better varieties of cane with improved and upto date methods of agriculture. The produce at the Government Experimental stations with such improved varieties as J 33 and the Mauritius, introduced by Mr Clarke, the Agri chemist of the U P Government from the sugarcane experimental Station of Shahjehanpur, has been from 700 to 800 mds and fully bears out the above statement. With such good results as these, the cane cultivation must increase in these provinces, specially because the poppy cultivation has been lessening of late, though the question has again been vigorously taken up by the Government. The cost of cultivation on the Government farms comes to about Rs. 70 to 90 per acre compared to Rs. 30 to 40 of the cultivator. The chief reason for this difference is that the farm has to pay for labour whilst the cultivator works himself. With a little increase of about 10 to 15 Rupees per acre for manuring, irrigation etc, the cultivator can reap the same crop as got by the farm.

Of course, Java gets as much as 1200 mds cane per acre and even more in some cases, but it possesses many natural advantages over us —

- (1) A rich alluvial soil
- (2) Suitable temperature
- (3) Plenty of water.

These are supplemented by the elaborate scientific research work, which is always in progress there. All these advantages are counterbalanced by the heavy freight of about Re 1/8 per maund, which she has to pay from Java to India and then there is the duty of 10%, so we can easily compete with them, if we simply try.

With the following instruments in hand, there is no reason why India and specially the United Provinces, where so much cane is grown, should not be able to hold its own against the imported sugar.

- (1) Scientific Cultivation
- (2) Up-to-date Machinery
- (3) Expert advice
- (4) Research work.



If you read the history of sugar manufacture in Java, you will find what the above things have done for that country. The following figures are instructive —

Year	Yield per acre (sugar)	Cost of manufacture.
1872	1.72 tons	
1880	2 09 „	
1888	3 26 „	£10 7s. per ton
1904	3 93 „	£ 7 13s. „
1911	4 30 „	

So, under scientific organisation, the cost of manufacture has decreased, while the outturn has become threefold and the Director of experimental stations in Java, is looking forward to an yield of 7 tons per acre, which, it is said, has been possible at least in case of one estate. If not the same, much the same is possible for India, if genuine efforts are made to overcome obstacles which lie in the way of improvement.

The present outturn of gur in India is averaged at 32 mds. per acre. Though in the sugar belt at some places, it reaches as much as 60 mds per acre, the average produce is lower than that of Java in its worst periods. A miserable condition indeed!

### Agriculture.

The first thing to be improved is the agricultural side of the sugar industry. The present state of things is very unsatisfactory, and that improvement is possible, has been indisputably proved by the different experimental farms of the Agricultural department in this country. Dr Barber, the sugar cane expert to the Government of India has been doing very good work and here in Unined Provinces Mr. Olarke, has shown very good results at the Shahjehanpore farm. The chief obstacle in the way of improvement is ignorance of the masses combined with their prejudices and poverty. The bulk of the agricultural classes are quite illiterate and they adhere to the old and primitive methods of agriculture, which their forefathers practised, with little or no change. Their ignorance makes them look very suspiciously upon anything which means a departure from their old customs. They have the desire but not the zeal which is so essential for improvement. Here I may also mention that the land tenure policy also hampers their activities, as they think, it is no use making a land rich, which later on may not

remain in their possession. As Government aid in this matter in the shape of legislative reform is uncertain, there seems to be at least one practicable way of getting over the difficulty so far as cane cultivation is concerned and it is that Central factories should have their own estates, which they should lease out to farmers. The factories can give the farmers not only a secure tenure, provided their method of cultivation is good, but can also help them, by giving them suitable manurial and irrigation facilities, the cost being deducted from the price of cane, which under the agreement they will be bound to bring to the factory.

Our cultivators, at present, are very slow as well as indifferent to adopt the improved methods of agriculture, which are practically shown to them from time to time at experimental stations of the Government. In some countries, Govt agricultural department, undertakes to cultivate for the farmer a part of his land on scientific lines and thus prove to him on his own land the practicability of the scheme, which the department puts before the farmer. The seed is supplied free by the department, but the cultivator has to pay the cost of cultivation, the final product going to him. I think there is one weak point in this scheme. What is needed is that the farmer should be insured against any loss if the experiment is a failure, the government undertaking to pay him a certain minimum, which may be equal to the price per acre of the local variety of cane. Otherwise the scheme is very good and commendable. A similar scheme has been devised by the U P agricultural department and I am given to understand that experiments with cotton have been tried at Budaun with success. There is every likelihood of the experiments being applied to sugar cane under the administration of the Hon'ble Mr Hailey, who seems to be specially interested in the Sugar industry, as two important Sugar factories in the U P have received liberal government support in his regime and the experimental works at Nawabgunj set up. But all these things will prove of little value if the cultivator is not fit to understand these new schemes and experiments and profit by them, and this will never be unless he is educated. So, one of the great duties of every well-wisher of his country is to spread education among these men and the education must suit their requirements. I mean each farmer boy should attend some agricultural school or college after his primary education. At present, there are very few Agricultural Colleges and schools in

the country and even those provide little help to the cultivators, as 95 percent of their number does not even know how to read or write and as such cannot derive any benefit from these institutions. The first remedy, therefore seems to be the spread of education, without which little can be done.

Some of the cultivators, who have a desire to try new methods cannot provide for the mechanical appliances which are as a rule costly. The Indian farmer, is the poorest in the world and his poverty is doomed unless he can get more out of his land by improved agricultural methods. Govt has established many co-operative banks to lend money to the cultivators at a nominal interest and these are of great value to him, but more banks of this nature are required to be opened by the people themselves.

In these provinces canes, which are very fibrous and have a hard outer skin, such as the chin class are generally grown, for they are very little liable to disease and do not fall an easy prey to wild pigs and jackals, which so much abound in the country. These varieties are also very easy to cultivate and do not require so much care and labour on the part of the cultivator. The cultivator cannot afford to employ labour and as he is himself sometimes underfed, he cannot work sufficiently hard, and so he is content to have whatever he can get with the least trouble. He does not know whether this contentment of his affects the Indian nation at large. If he learns to be more careful and laborious, he could substitute better varieties and get double the produce from the same field, and this would greatly contribute towards improving his general condition.

As to the manure required by these better varieties, he can use properly prepared farm yard manure, if he cannot buy costly manures such as castor cake etc. He will also have to use fencing for these softer varieties as is done at the Government experimental stations, so long as the wild animals are not exterminated.

### Crushing

Even in the present state of cultivation, insufficient crushing perhaps constitutes the most serious drawback that affects the outturn. The total produce of sugar in the country will greatly increase, if this could be stopped. Big cane producing countries, which have been making sugar under Scientific control have nearly agreed

now that mill crushing is the best form of taking out juice from the sugar cane. The diffusion process is fast falling into disfavour, as it entails an additional evaporation of a large amount of water, though this process is still followed by Aska sugar factory in India and one or two sugar factories in Louisiana. Very powerful mills with as many as nineteen rollers have been devised, but those generally used contain fourteen rollers and give an extraction of from 70 to 80% on the weight of cane employing maceration process. While other countries in the world are making this progress, we continue using small two to three roller mills which do not take out more than 50% giving sometimes as low as thirty. These, too, as a rule have to be slackened to make it easier for the underfed bullocks that drive them. How unfortunate it is that our farmers cannot even use powerful mills of the three roller type, which, if properly tightened give an extraction of about 58 to 59%, but requiring much stronger bullocks than can be had generally. It is moreover unscientific to use vertical mills, as some of the expressed juice is reabsorbed by the lowermost cane passing from the mill. Any improvement in a small way seems to be quite impossible. The first thing is to have good powerful mills and the second thing some kind of motive power to drive them. All types and all strengths of horizontal mills are now available in foreign countries. A six or nine roller mill giving an extraction of about 65 to 67% will be very useful for those who want to crush their cane themselves. As to the motive power to drive these mills, the most suitable seems to be the oil engine, as it does away with the necessity of having a certificated driver and is not governed by the factory rules and regulations, but on the other hand skilful engineers have condemned it as being too intricate a piece of machinery for this purpose. The oil consumption is another handicap and though it can be safely used on a farm or by small khandsaris in the initial stages, who can utilise their megasse in boiling the juices, it will have to be given up as time advances and people begin to realise the numerous advantage of a modern factory. The best thing for the cultivator would be to deliver his cane at the nearest factory when these are established, because a factory is the only place where the cane can be handled in the best possible way.

At present the cane is either turned into Gur by the cultivator himself in his primitive way or sold to the khandsari, who is a small sugar maker. This khandsari is a money lender too and

very exacting one. He lends the money to the poor cultivator at an exorbitant rate of interest, and as generally the cultivator cannot repay, the interest is increased at a compound rate by leaps and bounds, only to be made good by cane crop every year. Thus the cultivator becomes his slave for years. The khandsari system is condemned for the process is very wasteful, and this will have to be entirely abolished in the long run. but if these good men may be ready to take a lesson from the signs of the times, they may easily keep mills driven by small portable engines of the kind most suited and use them at their own place as well as hire them out to their constituents on reasonable charges for crushing their cane. But the ultimate step must be to induce the cultivator to part with his cane to the factories, and this, though a difficult job to begin with, is bound to succeed.

### Manufacture

From the economic point of view, Gur manufacture for the purpose of refining is a wasteful process, which should never be encouraged, but the case of India, is rather different. In the first place, Indians consume gur instead of sugar to a very large extent and secondly India, at present, has not got so many cane crushing factories, that could handle the enormous produce of cane in this country. Gur manufacture, therefore, it seems to me, must go on in this country unless new central factories spring up and people gradually take to consuming sugar, with the advance of civilisation. The present state of things is that Gur producing districts such as Meerut etc., are increasing their area under cane, while those producing sugar (country methods) are lessening it, as their sugar is quite unable to compete with the imported article and has to find shelter in the religious prejudices of the people. I agree with Mr Wynne Sayer of Pusa that lime is not required to be used in Gur manufactured for direct consumption, rather it is to a certain extent injurious to the health, in my opinion, as the lime is not fully eliminated from the finished product as in the case of sugar, and then in gur for eating purposes, we have not so much to look to the check of inversion, though it is always better for more than one reason to avoid it. No doubt, lime is the best reagent for clarification of gur manufactured for refining purposes as it checks the inversion and is very cheap. Gur for the purpose of refining therefore, must be made on modern lines and refined with up to date

machinery, so long as sufficient number of cane factories do not spring up. A lot of sucrose is lost by inversion and caramelisation in the gur prepared these days generally and most of it is so badly prepared that it can neither be used for eating purposes nor can be refined with any profit. The indigenous refining method is also a very wasteful process as it can only yield about 28 to 30% sugar on the weight of Gur refined.

Modern refining methods with scientific gur making ought therefore to be substituted for the old ones for the present, but I must repeat that in the long run gur refining will have to be given up as a refinery seldom pays unless extraordinary conditions prevail.

### Sugar.

At present, there are two processes of manufacturing sugar in this country. The first is the old and indigenous method, which the Khandsari practises, and in which he does not get more than 3% sugar on the weight of cane. The second is the improved method of making sugar by scientific methods, which a few factories mostly established and managed by Europeans follow. The average outturn by this method in well managed factories is about 8 to 8.5% on the weight of cane. It is needless to say that the old method is very wasteful and must be replaced by the new one, if we want to revive the industry. Of course, most of the newly established cane factories, excepting a few, admit of improvement in some way or other. Mr Abel, who made a tour of India in 1914, thus points out the defect of our factories in his 'Notes on sugar machinery and manufacture in Northern India'.

- (1) Insufficient lighting.
- (2) Approaches and exits ill arranged
- (3) Accumulation of cane in the yard which prevents the cane to be crushed in order of its arrival, and thus turns some of it stale.
- (4) Poor crushing
- (5) Inferior Appliances.
- (6) Shortcomings of the crystallisers.

Mr Abel does not mean that all these defects exist in all factories. These are general defects in factories and ought to be removed.

The present number of these factories in India is too small to handle even  $\frac{1}{50}$ th of the Indian cane crop. In the United Provinces, there are only four cane crushing factories, where so much cane is grown. In Behar, where there is the largest number of factories, enormous amount of cane is crushed by the small mill and made into gur, so much so, that most of the United Provinces refineries get their gur from Behar, where they find it cheaper than in other places. This shows the dire necessity of putting up more big up-to-date central factories to handle the cane in the most economic way possible. Of course, the question of cane supply to these factories, will present some difficulties in the beginning, as our farmers are as a rule unwilling to sell their cane to factories, but perseverance will overcome them. At least one central factory in each big sugar cane growing district should be set up and if it is found incapable of handling the whole output, the number should be increased, but for the present gur manufacture and refining on modern lines can go on in the off season. The two plants can be combined with a little additional expense.

A factory crushing from 10,000 to 15,000 mds of cane in 24 hours is thought to be a moderate sized factory and this factory will be quite suitable to be put up in a district which has about 5000 to 7000 acres under cane. The questions of providing capital for such a factory is likely to prove very difficult in our country, as we do not know the value of co-operation. Foreigners, in this country, as well as in their homes always succeed in their enterprise, as they can collect any amount of money by shares of small value and unless we can do the same, there is little hope of success. An individual cannot always be found ready to come forward with the full amount of capital required for such a factory, there are people in India, who can do it. The bigger the factory, the more handsomely will it pay, and the better will its sugar be able to compete with imported article. But for those who desire to have a small plant the government is experimenting with the one set up by Mr. William Hulme, the sugar Engineer expert to the Government of India at Nawabgunj, district Bareilly. This plant is quite suitable to manufacture gur and sugar both, and though it is yet in the experimental stage and alterations and additions are to

be made to it, it is sure that it can be made to pay a reasonable profit. The capital required is about 80,000 Rupees including a piece of land - necessary buildings and the plant can handle 50,000 mds of cane in the season. The outturn is expected to be 6% on the weight of cane, but the plant can have the addition of a vacuum pan and increase the outturn by 1.5 to 2%. A vacuum pan has not been put up at present, as the idea is that the plant should not require a skilful and technical management, so necessary for big factories. A description of the plant and its working can be read by those interested in it in the report issued by the Government and styled 'A note on the improvement of indigenous methods of gur and sugar making in the United Provinces' and obtainable from the Government Press for 4 annas. Extraction of some kind of oil from the oilseeds or some other useful work can easily be done in the off season with little additional expense. I wish to make it clear here that this factory is only meant for those, who cannot set up a large central factory, for none but big factories are desirable from an economic point of view. Two more points and I have finished. The first is the utilisation of bye products of the factory and the second is the Research work needed to make the industry successful. Molasses is being made into cattle food in several countries and megasse etc employed in paper working. We should do well to study all these problems and take in hand that which suits us the best, but the most important thing of all these is the Research work. As we try to profit by the researches made by other sugar cane producing countries, we should not lag behind to make special researches suited to the special conditions of our country, and for this the factory owners may make a federation as in Java and other places and put up an experimental station with highly qualified technical staff.

The task is very big and unless well organised and gradual efforts are made it is difficult to mend matters. Radical changes are not desirable and must not be attempted. There are many and great hindrances in the path of those, who want to take a share in the industrial uplift of our country, but faith and perseverance will make all difficulties easy. The technical and expert advice and control will be very necessary to put up big central factories and young men should be sent to foreign countries by private bodies, such as the Standing Committee of the Indian Industrial Conference to specialise in sugar Engineering and



Chemistry The Government cannot be expected to do everything for us, though it has been sending students for technical training to England of late The problem is difficult to be solved, unless we take up the question in earnest, remembering that God helps those who help themselves

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# A few suggestions regarding the increase of Sugar production in U. P., Agra and Oudh.

By BABU MUKTAR SINGH, Pleader, Meerut.

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India for the most part is an agricultural country and more than three fourths of its population live either directly upon Agriculture or any other profession indirectly connected with it. In the days gone by, Agriculture was considered to be the noblest profession and was placed on a much higher level than service now so highly thought of. Since the advent of the new ideas, it has been looked down upon and considered to be the profession of the illiterate. It is generally believed that any body and everybody can successfully take to Agriculture. It is a pity that a profession which requires the best scientific skill is considered to be the profession of the illiterate and even the sons of Agriculturists prefer to be outside the profession, no matter if they secure the very humble position of a subordinate in some office. This general feeling against the profession is mostly responsible for the lack of improvements in Agriculture. Then there is another idea prevailing in the minds of those who are the advocates of Agricultural improvements that the same machines and practical methods be adopted in India which are made use of in other western countries. I admit that there is a vast field for making improvements in Indian Agriculture, but it does not necessarily follow from it that we can absolutely ignore the practice prevailing amongst our own farmers. In the beginning, I entertained an idea that we should follow the western methods blindly and unless our farmers give up these crude and obsolete methods, no improvement is possible, but after studying minutely the details of the several processes and the principles involved, I am convinced that considering the economic conditions of the country, it becomes impossible to ignore the existing practice and to supplant the same by foreign so called scientific methods. Unfortunately our farmers have forgotten the principles upon which a certain practice is based and they cannot explain why they follow a certain mode of cultivation, but if you apply your mind to and study the thing minutely, you will be convinced that the practice followed by them, is the best under the circumstances. With these remarks,

I beg to ask my readers that before they advocate the idea of introducing some new scheme already successfully tried in foreign countries, they should consider also all the adverse circumstances of the country. I beseech my readers not to be hard and cruel upon our farmers in condemning wholesale their system of Agriculture, unless you can show practically on a sound business basis the superiority of your own system.

It is generally urged that the farmers do not follow the advice given to them by the Agricultural Department or by other well-wishers of the country, but if the readers will consider the question minutely, they will find that the Agriculturists will very gladly follow the advice, provided they are convinced that it will be paying to them in the long run. At least in our province after the failure of Mr Hadı's sugar scheme, agriculturists have lost all faith in the Department and they cannot believe in the efficacy of any new scheme unless the Department can prove its successfulness to the hilt. If any well-wisher of the country advises our agriculturist to follow a certain scheme and is himself shy of following it, what guarantee is there of its success and the practical farmer can legitimately demand its proof before taking it up himself. The poverty of the farmer does not allow him to set apart a certain sum for making experiments and thus the same routine goes on without disturbance. India is a country where agriculture is being practised from time immemorial and the Indian Agriculturist possesses a store of practical knowledge handed down by his forefathers and any suggestion disturbing that practical method means to him a lot.

If we take up the Sugar-cane Industry, we find that India was the pioneer in this Industry and people of other countries learnt the art from here. People from foreign countries called India the place wherein the honey plant was cultivated. It is a misfortune that a country which taught the art of Sugar-manufacture to the whole world, is now being defeated by imported sugar in its own home. Not more than 30 years ago, India not only supplied her own need, but could export her manufactured sugar to foreign countries. It was only recently that sugar began to be imported from foreign countries. No doubt the competition was not a fair one in its beginning and the bounty allowed by the foreign government, has stifled our industry and it is no good to say now that it is a fair competition. When the foreign countries have established their factories so firmly

at the cost of our industry, it is our turn to pay them in their own coins, if possible. Even to-day when the import has so enormously increased, the area under cultivation of sugar-cane ranges very high and it is doubtful if the whole world will be able to supply the needs of Indians for sugar consumption, if we give up the cultivation of sugar-cane. The consumption of sugar in India seems to be larger than that of all the countries of the world taken together. The Indian Agriculturist has decidedly a few advantages which are not possessed by any of the growers in the world. The first advantage is, as already pointed out, that the Indian grower need not find the market abroad to sell his sugar. Indian population will consume the entire produce of sugar, even if the produce be more than doubled. The disadvantages of a foreign market are quite apparent in addition to the expense of advertising, middle man, exchange charges, and freight charges of Indian railways in the country. The labour in India is very cheap, though people will at once say that it is better to pay higher wages to skilled labour than to pay less to an inefficient worker. But the readers must remember that the emigrants from India have made the sugar industry of Mauritius what it is to-day and though to-day it is a well established industry, in the country, still it is beyond doubt that the growers cannot work on successfully without the Indian labour. If Indian labour can successfully be made use of in foreign countries, why can it not be a success in India itself? The Indian grower, manufacturer and the trader can live upon a far less profit than the foreign grower, manufacturer and the tradesman. The natural resources of the country, are well suited for the industry and from time immemorial people have tried the same with success. This will be quite evident from the fact that the sugar-cane in India can be cut after less than 12 months, while in Mauritius the best sugar-cane producing country, it takes more than 21 months to mature the crops. Thus in Mauritius only one crop in two years is possible while in our country a crop each year can be grown. We find that after the sugar-cane crop is early cut in the month of November or December, a crop of pea which is sown in the month of March or April, is successfully raised, thus giving two crops in the same year. The cost of cultivation is very low and I doubt if the upto date machines can successfully compete with the cost in Agriculture. Besides these, there are good many causes which convince us that India is well suited for the Industry and it actually exported its sugar to foreign lands 30 years ago.

I am asked to limit my remark to the prospects of Sugar Industry in my own province and therefore I shall confine myself to the method and practice of my own province only The Province of Agra and Oudh produces more than half the sugar produced in the country The vast area sown with sugar-cane in these provinces will be clear from the following figures —

Year	Whole area under cultivation in acres	Area under sugar-cane cultivation in acres	Year	Whole area under cultivation	Area under sugar-cane cultivation
1901-02	35389656	1226691	1909-1910	35985000	1037616
1902-03	34838028	1151777	1910-1911	35646036	1047111
1903-04	33152034	1089602	1911-1912	34986711	1340637
1904-05	35847913	1212586	1912-1913	35453686	1424064
1905-06	34439514	1220587	1913-1914	32632710	1389347
1906-07	35568177	1359834	1914-1915	355562555	1194354
1907-08	32446288	1471831	1915-1916	35633086	1260914
1908-09	3527892	1120070	Total	524360352	18547021

If we take the average of the last fifteen years, we find that the average area under cultivation is 3,52,78,928 acres out of which 12,36,468 acres are cultivated with sugar-cane

Referring to the area under cane cultivation in Mauritius, we find that it comes to only 13,3,230 acres which clearly shows that we cultivate canes on an area which is ten times the land upon which Mauritius cultivates sugar-cane But if we refer to the produce of our province with that of Mauritius we are startled with the result

The production of sugar in our province will be clear from the following figures —

Year	Total outturn of unrefined sugar in Tons	Year	Total outturn of unrefined sugar in Tons
1906-07	1260000	1911-12	1260000
1907-08	917000	1912-13	1302000
1908-09	841000	1913-14	975000
1909-10	956000	1914-15	1094000
1910-11	1050000	1915-16	1283000
Total..	—	—	10938000

This gives an average of 10,93,800 Tons of unrefined sugar. If we take up the area under cultivation with sugar-cane in the last ten years only and divide it by 10, we get an average area of 12,64,677 acres. By dividing the whole average production of sugar, we get 865 Tons unrefined sugar per acre. The figures noted above, are taken from the season and crop reports and I do not think that the figures of the total yield of unrefined sugar are correct, as the method of arriving at these figures is very defective and empirical. The average of the acreage is multiplied by the normal amount of sugar produce and it is again multiplied by the figure arrived at by comparing it with the general condition of the crop, 100 being the normal crop figure. In this method, no allowance is made for crops of different areas which are above normal and moreover these are not actual figures. I think, if actual figures be somehow taken, it will be found that total yield is far above these figures. In India Agriculturists do not keep account and therefore it is very difficult to know the real state of affairs. The farmer and the Zamindar both are afraid of the Government.

to keep the account of their outturn of crops, lest the Government may increase the revenue. However as no other figures are available, we compare these figures with the produce of Mauritius. I have not yet received the current reports of the yield of sugar and the area under cultivation but I have taken these figures from 'the Sugar Industry of Mauritius' and find that the sugar production in 1816 was only 0 50 Tons per acre, while it is in 1908 1 785 and the average yield from 1901-09 being 1 72 Tons of refined sugar. The yield in these years must have increased as upto-date methods have been adopted and great efforts are being made to increase the produce, but if we take 1 785 to be the present outturn of refined sugar per acre, it is more than double the yield of unrefined sugar in our province. If we take the average yield of refined sugar to be 40 %, we get only 346 Tons of refined sugar per acre and thus find that the maximum produce of Goor reaches about 100 mds per acre or 3 57 Tons or 1 4280 Tons of refined sugar taking the average of 40 % of refined sugar though it will exceed 50 % in some cases, as the quality of goor of the Meerut District is far superior to the ordinary goor in other places. This outturn compares favourably with Mauritius yield and we can safely say that the Indian soil is quite capable of producing more than the average yield of other countries. If we refer to the time required to cut the cane crop in Mauritius, we find that it takes more than 20 months to mature a virgin crop of sugar-cane, while in India it takes less than 12 months. The rotation crops too in Mauritius take about 12 months, while in our country, we can sow peas in a sugar-cane field when it is early harvested.

The amount of yield depends on two main factors one is the produce of canes and the other the method of manufacture of sugar. I shall discuss this point later on, but here wish to point out that in comparing the average produce of both the places, the decidedly superior method of extraction and manufacture should not be ignored. The total amount of cane juice that we can extract is only 60 % while in Mauritius it reaches about 85 %. The amount of sucrose is lost in our method of manufacture, while in the method of manufacturing sugar by vacuum pan in Mauritius, the amount of sucrose is very high. Allowing for the difference in amount of cane juice extracted in our province, the amount of sugar ought to be not less than 1 190 Tons per acre or 2 97 Tons of gul per acre. The average yield of unrefined sugar should be about 84 mds per acre in our province.

This is not a very large quantity as it has been shown above that in one Tahsil of Meerut the amount is even higher than this expected yield without having recourse to the costly manures employed in other provinces. Thus there is a vast margin for making improvements in sugar-cane cultivation.

I have stated in detail in my Urdu pamphlet on sugarcane cultivation the methods to be adopted to achieve this end and it will be unnecessary to enumerate them here. However a few points will not be out of place to discuss. My idea is that without having recourse to the costly machines about which our growers know nothing, we should study Indian Agriculture very minutely and the principles upon which the present practices are based be discovered and the farmer be made well acquainted with those principles so that he may be able to realise the real worth of the practice he has been following from time immemorial and he may further be able to modify the practice according to the season and the land under his cultivation. If the farmers be taught the principle involved in their different practices, I hope the produce will be quite satisfactory. The regeneration of any country does not lie in blindly following the practices of another country but in assimilating the principles, involved and in modifying those practices according to the needs of one's own country. Indian Agriculture if properly studied will, I am sure, reveal a good many new principles to the scientific world even to-day, though the Art is in the hands of people who are quite illiterate and only follow a certain practice, because it was followed by their forefathers.

In producing good crops of sugar-cane, the first question to be considered is that of irrigation. No other crops except vegetables require so much irrigation as sugar cane. No improvement is possible, unless we can surmount this difficulty. This difficulty can be overcome by two methods one, by improving the sources of irrigation and secondly, by improving the method of cultivation, so as to reduce the necessity of irrigation to the minimum. As to the former, irrigation is generally done by canals and wells. Canal water is generally utilised for sugar-cane cultivation and it is found that only in those places where canal water is available, a large area is sown with sugar-cane. But unfortunately the Canal Department is extending the canal works without increasing the amount of water in the canals proportionately and the result is that the crops suffer



on account of want of water at the proper time. In Meerut Dist, the whole crop was damaged, as the water was not available in the last months of the crop. The cane crop is very much reduced even if watering is not done at the proper time. The canes become quite hollow and the cane juice is dried. If we irrigate after such a critical period, very little improvement is effected. Thus it is quite necessary for the Canal Department not to stop the canal water abruptly and the canal works should not be extended unless the proportionate increase in the amount of water is effected. As to the well irrigation, it is found that the yield of sugar is far better in well-irrigated area, than in the canal water-irrigated area. This is not the place to enter into the discussion as to why it is the case. The most important point that can be urged in favour of well irrigation is that the cultivator can irrigate his fields whenever he thinks it necessary to do so, while the canal water is not under his control. The difficulty is that well water is very costly in comparison with the canal water. Even if the irrigation is effected by pumping Engines the cost is very high. If the pumping engines become common in the province, I am sure the cost will naturally come down and then the produce will be very high at a lesser cost. The Government has tried to introduce the pumping engines by advancing the money to the farmers but it is not tried everywhere and it is impossible to succeed unless well trained men are supplied by the Department or the cultivator be given a training in some regular school for a period sufficient to acquaint him with the mechanism of the machinery and the use of each part of the machine. There have been several cases where the pumping engines have not worked satisfactorily because the driver was quite ignorant and he spoiled the machinery. It is no good to teach the starting of the engine only, but every thing in detail ought to be taught. Generally the amount of oil consumed by these oil engines is very high on account of improper working. Then there is the question of wells for these engines. No engine should be recommended, unless it is seen that the well upon which the Engine will work contains sufficient supply of water.

Now I come to the method by which the water required for irrigation can be reduced to a minimum. I am sorry that the Government has done nothing for trying the dry farming method of Agriculture in the province and so nothing definitely as to its success can be said. This is not a fit place to enter into a discussion about its utility, but it is certain that the principles employed in the

system are worth following. I hope to place before the public my complete scheme next year about its application to different crops but this much has been proved that it is possible to reduce the number of waterings to a minimum by proper ploughing and hoeing of the fields. In Bijnor district, we learn that sugarcane is produced without irrigation and, in Mauritius too a large area is unirrigated though in the latter country the rains are very frequent. If we refer to the season and crop report of 1915-16, we find that out of the total area of 1260914 acres of sugarcane only 897480 was irrigated and the remaining 363434 acres, more than one-fourth was not irrigated. If it be investigated how so much area could produce sugar-cane crop without irrigation very important facts must come to light. In Bijnor the land is ploughed 20 times and sometimes forty times before the sugarcane is planted. This seems to be the secret of growing crops without irrigation. There is an old proverb चार ब्यारी चौदह खोद । तब खोद गन्ने का लोच Irrigate once and hoe the field fourteen times, then the sugar-cane crop will be excellent. In places where irrigation is done with canal water, practically no hoeing is done. For want of hoeing, not only the water is very soon evaporated but the upper surface of the soil becomes very hard and proper aeration is impeded. This is not the case in well irrigated area where proper hoeing has to be followed. If sugarcane be sown after ploughing the field at least for 10 times and then hoeing be regularly practised, I am sure very small quantity of water will be sufficient. When the sugarcane plants are very small after hoeing, they must be rolled over so that the upper surface be well pulverised and the water underneath may be well preserved, this will minimise the amount of water to a very large extent.

It is sometimes urged that the sugarcane varieties sown in other countries contain large amount of sucrose and they should be at once sown in the country. The varieties imported by the Department belong to the Pounda variety of the province. Pounda requires much more water and is quite unable to resist the ordinary drought. Unless a farmer has full control over the well or canal he should not cultivate this variety. This is why the pounda or chewing cane is never grown for manufacturing goor. I am sure that Shahjahanpuri pounda is a very good kind of sugarcane if it be grown for the purpose of making sugar but people do not take it up, thinking that it requires very great care to grow it and besides this, more waterings are necessary. The same is the case with these

imported varieties By experiment it has been found that the percentage of sugar contained in the juice is much high but it is doubtful whether in the ordinary field and in ordinary circumstances in which the other varieties are sown it will fare well A few years' trial will show whether it suits the province. For the time being ordinary varieties will do very well, as in a paper read at a previous session of the All-India Industrial Conference it was shown that the quality of Indian canes is not far behind the varieties of other countries I think it will take time to acclimatise the imported varieties in the province and a great deal can be done by that time by proper selection in the varieties already existing The points necessary to be considered in the selection of a variety of cane have already been dealt with in my Urdu pamphlet as well as my previous paper and it is unnecessary to repeat them here I think if Pusa institute by cross breeding succeeds in producing new varieties of canes well suited to the province, it will be far better and more successful than to import the foreign varieties I hope the department will try to follow cross breeding in canes as they have done in wheat It is better to improve upon our own existing varieties on the same principles upon which the people of other countries have created new varieties than to import their varieties and try to acclimatize them In my district सुरैठा, धौल and चीन are the best successful varieties and I am sure that these varieties can be improved to a large extent simply by proper selection and proper care of growing them continuously After the question of irrigation and variety comes the question of manuring In foreign countries costly manures are employed, but I am sure these manures will never pay in our province as the proper handling of them requires a scientific knowledge and their prices in India are prohibitive. In other countries, artificial manures are the bye-products and thus they can be had very cheap, but in India we shall have to import them at a very high price The farmers in India are very poor and the interest charged on the sum advanced to them being very high, it becomes quite doubtful whether it will increase the crop to such an extent as would repay its cost and a sufficient margin of profit left on the investment made The artificial manures exhaust the capacity of the soil and thus they cannot be said to be of any advantage in the long run Again the use of artificial manures requires a very great skill which is wholly wanting in our farmers and their injudicious handling may do more harm than good. The use of the artificial manure

will necessarily require more water and thus the cost of producing a crop will be indirectly increased. As far as I have thought over the subject, I am of opinion that time has not yet come when we can recommend the use of artificial manures with safety to our agriculturists. Several manures have been tried at the government experimental farms but the information given in the report is so meagre that no conclusion can be drawn from these pamphlets. It is not at all known under what circumstances and in what sort of fields a certain manure was tried. It is just possible that an artificial manure rich in phosphoric acid may come to be applied to a field which is itself rich in that element and may produce no good at all.

But there are other slow acting and sure manures towards which we can safely draw the attention of Agriculturists. The first and the foremost is the stable manure or the pen manure. The manure should be properly stored and the cultivators be asked to make use of the urine of the cattle. Urine being a very good manure it should be properly utilised by the farmer. Next comes the use of green manure. Green manuring is known since time immemorial to the Indian cultivators and they generally make use of Sann crop as green manure. No doubt they do not know that the plants generally used for green manuring purposes develop the growth of the nitrogen fixing bacteria at their roots, their general belief is that the organic portion of the plants ploughed under the earth has their beneficial effect on the sugar-cane crop and it is therefore not at all understood by the farmer whether his crop has the right sort of bacteria over its root or the field. Nitrogen is a necessary food for all the plants and much more so for a successful sugarcane crop unless the green manure crop supplies the field with nitrogen from the air it cannot be of much advantage. If our farmers be taught the importance of this principle, we can very easily increase the yield of our fields. Where the sugarcane crop is sown after the kharif crop and the fields are left fallow, some catch crops may safely be sown in cotton crops.

I have tried the experiment this year and I cannot say anything as to its result but so far it seems to be almost certain that the yield will be increased to some extent at least. If any legume crop is to be used as green manuring crop for sugarcane, it means that the sugarcane crop will take about 18 months to mature as no crop can be sown in the whole ensuing winter and it seems to be doubtful if it will repay the loss of one crop in this way. But if a

catch crop like this be used there is no question of any loss. However the farmer should be encouraged to sow green manuring crops and the Government be asked not to levy any water rates for growing such crops. The green manure will not only be useful for supplying nitrogen from the air and to make other plant food in an available and soluble form, but the organic matter present in the green manure will also be useful in keeping the land warm and affect physically the soil of the field. The organic matter will improve the water holding capacity of the soil and the crop will be able to hold its own better in the season of drought.

Amongst the other manures that can be supplied to the cane crop the oil cakes are very important. I was supplied 100 mds of Mhowa cake this year by the Agricultural Department for which I am under deep obligation to it. The experiment has proved very successful and I am of opinion that it will pay even if it can be purchased at 8 as a md though I have not yet been able to secure the same at this price. My whole village has watched the experiment very keenly and some of the cultivators are quite willing to pay for the manure. The Agricultural Department advised me to use 15 mds of the cakes per bigha but I find that it is too much and if the fields be not exceptionally poor in quality, half of that amount will prove quite sufficient. If there be a market for the oil cakes so many factories will be successfully established in the country and the export of an enormous amount of oil seeds be stopped and in its place we shall be able to export the oils to foreign countries and thus so much labour and capital will be utilised for the country. Nim cakes have proved a better manure than all the cakes found in the country. If the farmers are convinced of its utility a large amount of the cake will be available at the cost of collecting the Nim seeds which now generally go to waste. Now the people are learning its utility and this year though the crop of Nim seed was exceptionally good, the Nim cake could be sold at  $1\frac{1}{2}$  Rs a maund.

There is only one more suggestion about the growing of cane crop which I think will not be out of place to mention. The cane crop is generally planted in furrows which are not very deep. The cane crop thus does not send its root sufficiently deep and sometimes when the rains are good and followed by strong wind the plants are uprooted and the whole crop is spoiled. If the canes be planted in rains it will be very useful and hoeing and watering will be very

easy This will entail no doubt a small amount of extra labour but it will repay its cost very soon In such a case, manuring will be easy and cheap as very small amount will be sufficient and I am sure that if the process be shown to the cultivators they will at once adopt it

Though a great deal can be said about the cultivation of the cane crop the space at my disposal does not allow me to enter into details But I am sure if this information is brought home to the cultivator he will at once follow it practically and a sure increase in the yearly yield will be the result In this way, we shall be able to at least double the yield of our cane crop, to cut down the prices current and to compete successfully with the foreign imported sugar

When the crop is ready there naturally arises a question whether factory system of milling should be adopted or the old milling and gur preparing system be adhered to Before expressing my final opinion, let me state in some detail the possibility of a factory system in our province There are certain apparent difficulties which are seldom taken into account when the old system is compared with the new. There are certain very important drawbacks in establishing the factory system in India and they are either thought of to be very minor ones or are wholly lost sight of

The establishment of sugar factories can be divided into two clear departments one can be called the milling department and the other the sugar producing department First let us consider if the milling by the use of steam engines and by 12 rollers or 9 roller mills will pay in the province The first objection which is a very important one is the Tenancy system in the province The whole culturable area excepting the waste land is divided into very small patches of land The field of one tenant joins the field of another tenant and hardly 50 bighas of land of one cultivator are found at one place and in one compact area of land This means a serious loss in supervision and improvements cannot be made under the circumstances A few of the tenants would have tried to construct wells upon their fields, but on account of this difficulty they are unable to do it The same is the case with the landlords The want of compactness in area is a very serious drawback in Indian Agriculture The spirit of co-operation which was very common before is now wholly wanting An attempt was made to make compact

holdings but the landlords did not utilise the opportunity and this suggestion vanished in the air. The partition proceedings have done worse and sometimes fields as small as 1 Biswa only are allotted to one co-sharer and another Biswa to another. A field which was of 30 bighas before is thus divided into patches of several fields, some of them do not measure more than a few biswas. These difficulties cannot be removed by any enactment unless the landlords and the tenants combine together and try to overcome it. In my own case, I know that in spite of my willingness to get the worst area in the village, the co-sharers are not willing to allow me any compact area for my share. This is a very great drawback in the way of scientific Agriculture. Then every cultivator must produce every crop that is generally sown in the locality no matter if his fields are not at all capable of producing that variety. In ancient times, this system must have originated in the principle of rotation of crops but now the principle is forgotten by the people and only the practice exists. This practice makes it impossible to find the whole area sown with sugarcane at one place in the village. The fields of sugarcane are scattered about and a good deal of time and labour is unnecessarily spent upon transporting the canes from the fields to the crushing mill. Had the whole area been at one place, a few mills in the centre or a big crushing mill driven by the engine would have been sufficient. The factory for crushing canes, therefore, cannot be established with advantage in these villages. Sugarcane is a very extraordinary crop which requires a very scientific and skilful handling. You cut your canes early in the morning and are not able to carry them to the factory till the evening or the next day to the crushing mill which is some miles away from the fields and there too they cannot be treated at once. The juice begins to be spoiled from that very moment when the canes are cut from the field. The more the delay caused in crushing them the more inverted sugar is the result. How far this loss takes place can be judged from a practical instance. I heard at Vizagapatam that a sugar factory worked at a loss for 2 years continuously as the rolling stock was not available to carry the canes to the factory and the canes were to remain in the sun on the railway stations sometimes for full two days before they could reach their destination. Afterwards this mistake was realised and a better arrangement was tried. The same has been the case with the Pihbit factory as I learnt from a friend of mine. The cane juice begins to evaporate no matter in however small

quantity it may be, the upper skin of the cane begins to harden by allowing it to remain uncrushed for a time after it is cut. Even in villages every cultivator knows that the juice of the canes cut and kept for one or two days becomes acid-like and the yield of gur is very poor. As in India there is no efficient arrangement for transport excepting the ordinary slow driving bullock carts, how can the crushing factories receive fresh supplies of canes? In foreign countries, the whole estate extending over a few miles is managed by a single company proprietor and transport arrangements are made, which carry the canes to the crushing mill as soon as possible bringing down the loss to the minimum. Is this possible in India under the present circumstances? If not, as I think it cannot be, how can a cane-crushing factory thrive in the province? Meerut, Bareilly and Bijnore produce large quantities of canes, but I doubt, if any cane-crushing mill can succeed under these drawbacks, unless leases of land be taken up and the cultivation work of the whole area in several villages be done by the company itself. This seems to be impossible, because, in the first place, it requires a large amount of investment and in the second place, the occupancy or proprietary etc tenants cannot be got rid of. I do not know how much cane juice is evaporated by allowing the canes to remain uncrushed and how much sugar is inverted, and therefore, I cannot write on the subject with authority but I am sure, this is not a small item of loss which can be ignored. I admit that converting cane juice first into *gur*, to prepare its *rab* and then to extract refined sugar is a very wasteful process, but I think we cannot avoid it. Then there is one more serious question to be considered. If a factory is worked with canes, it cannot work for more than 4 or 5 months and thus the interest of investment, upkeep of the factory, the pay of the servants will have to borne for 12 months: & the factory will have to pay for 8 months without taking any work at all, unless it is run on a system by which it may be utilised for other purposes during the time the sugar work is stopped. It can very well be said that we may have a combined factory which will work for four months with the canes and for the remaining 8 months it may work with gur. But when we say that for 8 months the factory will work with the gur, we admit the necessity of making gur by the cultivators and thus cannot say that the process of gur making be stopped at once. The only point to be considered is, whether a sugar



factory with its own cane crushing plant is better paying than the one which only produces its sugar from the gur purchased from the people. I am of opinion that the latter will be much more paying in the circumstances in which we are working.

Then the question naturally arises is it possible to get rid of the wastefulness of the present cane-crushing mills? Is it possible to avoid the loss caused by the defective crushing mills which do not extract full quantity of juice from the canes? In India, the average amount of cane juice expressed by the crushing mills is about 60 per cent. About 40 per cent remains in the bagas. I am told that the Engine driven mills can crush about 85 per cent juice generally in the western countries. This is decidedly a very high loss. But a question arises is it due to the defective crushing that so much juice is left in the cane or whether the maceration system has also much to do with this yield? I think all these two factors combined increase the yield no doubt but the pressure too is far more than caused by these mills. Very big rollers are employed and the number of rollers employed is sometimes more than 12. I have already pointed out that the cane crusher driven by a big engine will require a very large quantity of canes every-day and the want of proper and quick conveyance will not make it profitable to work with them. I have already suggested in one of my papers that these crushing mills can be improved a little in the first place. I suggested that the surface of the rollers be made very rough, and that they should be made of a material which may present always an even surface to the canes. I am of opinion that the megass may be saturated with water and again pressed in the mill. This will cost very little labour and will more than pay in its yield. No doubt this will mean an extra amount of fuel in boiling the juice. But if there be three pans employed instead of one only, they will remove this difficulty. A well constructed furnace will consume very little fuel and the bagas for which there is no other use will be sufficient to boil the juice. This will increase the yield of cane juice and a partial loss will thus be avoided. If we can manufacture cattle food out of the bagas, the cane juice left in it will be an advantage rather than a loss, as it will pay indirectly. In our province as well as in the whole country, the fodder sometimes sells very high and there is decidedly a ready consumption for the fodder prepared from the bagasse but in that case some other fuel will have to be substituted for it. Again if the bagasse be washed out with

water very thoroughly the whole of the juice can be expressed without the use of any costly machinery whose working will be very difficult. For this purpose, the bagasse will have to be put in the boiling water before it is pressed again and sent for drying. This method is worth trial and for an efficient working of the process, a few pans will be necessary to hold the different grades of the juice. Thus we can make use of water instead of expressing the canes by Engine driven mills. This is a question of experiment as to how much the yield will be in this way and the probable cost of the same as this will require larger amount of fuel and no exhaust steam being available in India, it has to be dried on open fire. The fuel too will not be cheap but we can work so economically that the amount of washed out begass and trash may be sufficient for the purpose. I am sure, that this system will give a greater yield than the crushing mills driven by the costly Engines. I hope that some of the gentlemen interested in the improvement of sugar industry will try the experiment to prove its efficiency. This system can well be tried this very year by the Agricultural Department or by the conference under its own supervision. It will not cost more than Rs 2000 to try the experiment for a sufficient period, to give the detailed information and a comparative data or the conference may very well set apart this amount for the purpose and may hand it over to any one of its members for a fair trial and report. This is not a very large amount and can very well be spent for the improvement of such an important industry.

As to the boiling, I have to say a few words. I have given in detail in my previous papers the method of boiling that I advocate and it will be an unnecessary repetition of the same scheme, if I try to express the same idea again. If the cultivators are convinced that a little carelessness on their part means a smaller amount of sucrose in the yield, they will be more careful and a large amount of loss will be easily avoided. The cultivators will be then able to produce better kind of gur. The best thing that I would suggest in this connection is that the factory managers be asked to pay on the amount of sucrose in the gur rather than on the color or the general appearance of the same. When the price of gur be offered on the amount of sucrose that it contains, naturally the cultivator will try to produce the best kind of gur. I have tried with success the production of far better gur than it is generally prepared. In my

district, I first introduced the system of liming the juice in my village and since then the use of lime has become a common thing in the locality and some of the boilers have become quite expert in making very good gur out of very poor juice with the use of lime and certain other chemicals. As in my village the whole gur is sold for eating purposes at a very high price in the market, it has not been found useful to send it to certain factories for analysis and to see the actual yield of the sugar. Once I sent it out for the purpose and learnt that an ordinary quality contained about 45 per cent of crystallisable sugar. If the cultivator be practically taught the method of manufacturing high class gur containing larger quantity of sucrose and a promise given to him that his gur will be sold at a higher price than that of gur prepared by the ordinary method, I hope he will be ready to learn it. Some of the expert boilers in my village go outside the village and get a good living and sufficient pay for making the gur in other villages. Their process is very keenly watched and the people think it to be a secret and try to find it out. If some school be started to explain the secrets of good boiling in some of the villages in each Tahsil of the district for three months, I am sure that a far better quality of gur will be produced in the province than it is done to-day and the waste will be much avoided. To open a school like this will not cost much, as it can very well be joined with some village crushing mill without paying for the cane, mill and the other necessary expenses. The only expense will be that of a good boiler and an instructor. In foreign countries, sugar schools are widely spread and maintained by the Government throughout the year. Why should they not be a success in the country which cultivates such a big area under canes each year?

India is not a country where very big factories can be established with success, as there is a want of skilled labour though the ordinary labour is generally very cheap. India can improve herself upon the same lines upon which Japan has made progress. Cottage industries should be as much developed as possible instead of big factories and this will create skilled and efficient labour very soon. This is another argument which can be urged against the idea of establishing big sugar factories in the province.

In the production of gur, a large amount of crystallised sugar is inverted when the gur is prepared. The amount becomes far

less in case the rab is prepared and is used in sugar refining factories. But there are two difficulties in the production of rab. One is that it is very difficult to store and carry from one place to another. The freight charges to the factories will be enormous and secondly the crystals of sugar will be very small. The rab cannot be advantageously centrifuged unless it is again boiled in the vacuum pans. It is an open secret that it is the last stage of boiling that produces the largest amount of inverted sugar in open fire boiling system. This loss cannot be easily avoided in the preparation of gur. There is no method which I know, of making the rab in a solid form so that it may be easily exported. The storage of rab in earthen pots no doubt will improve its solidity but still it will be difficult to export it as the earthen pots will be easily broken in transporting them from one place to another. This will also entail a very large expense of earthen pots which will have to be destroyed in the factory as their return will not pay. If other kinds of receptacles be made use of, they will be very costly and will not be able to suck up the amount of water and molasses contained in the rab. There seems to be one way to overcome this difficulty; viz every village may be supplied with small crystallisers in which the rab may be crystallised and the molasses as far as possible be drenched off. This crystallised raw product may be bought by the factories and refined into sugar. The molasses may either be converted into gur or sold to the distilleries. The process deserves to be tried. If the râb or the crystallised portion of râb be used instead of gur by the sugar refineries, I am quite certain that a larger percentage of sugar will be available, if the cane juice, instead of the amount of rab and gur be taken into consideration. The râb will be available at a cheaper rate than the gur.

It is a well-known fact that the raw-cane juice contains large percentage of inverted sugar than the ripe canes. This shows that nature converts the inverted sugar into crystallised sugar in the cane juice and if by any human agency the same thing be possible to do at a cheap cost the question of inverted sugar will at once be solved and the whole system be revolutionised. I have been entertaining the idea since a very long time, that it is possible to convert the inverted sugar into crystallised sugar chemically. I have tried a good many empirical methods and I have succeeded to a certain extent in producing gur containing larger percentage of sucrose than it is ordinarily prepared, but the success is very far off.

and unless some scientist takes it up, it is very difficult to realise the idea. I have given it out to the public and hope that you will help me in this scheme.

If the production of *râb* be thought to be very difficult, then the quality of *gur* should be improved. How the quality of *gur* is to be improved, I have already explained in my previous papers and it is unnecessary to explain the same here. But a few remarks will not be out of place. In liming, the first point to be noted by the farmer is to express the cane juice as soon as the canes are cut from the field. The canes should be crushed as soon as possible. Then the cane juice should never be allowed to remain cold for a long time as soon as it is extracted, it should be put on fire and limed. People are learning the use of lime in this province, but as only one pan is employed, it becomes impossible to at once heat the juice and to clarify it easily. By liming a scum is formed on the cane juice, but another impurity is taken down and unless there be a separate pan to decant this juice, it becomes impossible to take the full advantage of liming. Then in the one pan system, it becomes very difficult to control the fire at the end and this decreases the amount of sucrose to a very large extent. If proper attention be paid and three pans at least be employed, as suggested in my previous paper, a great improvement will be possible.

After stating in detail the few improvements which I think can at once be introduced by our farmers without any large extra expense, I want to point out to the Conference or the Ruling Chiefs that to save the industry from disaster, it is very essential that a few thousand rupees be set apart and some Indian gentleman well versed in the local conditions be employed for making a tour of all the countries and to study the circumstances and methods of other countries and introduce the improvements in India on a very small but sure scale. I am sure, if the method of cultivation and manufacture of other countries be taken into account and properly studied we can very safely and surely, at a very cheap rate, improve the Sugar Industry and save it from failure. If Japan in these two years could export its sugar to India, what doubt is there that by proper study we shall be able to hold our own in the country. Japan is not an Agricultural country and nobody could believe that Japan will be able to export its sugar to India but we have seen that Japan has successfully undersold

sugar in our own country It is no good to ask for a few papers once a year, on different subjects, but the time has come when the Conference should take up the task in right earnest and should set apart at least 10,000 rupees for the study of this important industry If this industry can be saved, it can be saved now or never The practical work should be done by the Conference and it should show that at least in Agricultural industries India can hold its own

With these few words, I beg to conclude and pray to Almighty that He may bestow his favours upon us so that we may succeed in our struggle for industrial regeneration and be able to see our country on the same pinnacle of glory which was hers in the days gone by

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# The Development of Minor Industries in India with special reference to Wood-working Industries.

By H. E. Kinns, Esqr ,

Superintendent, Government Carpentry School, Bareilly

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Judging by the quantity of articles made solely of wood which are imported into India, there is obviously room for considerable development in Indian wood-working industries. Material equally well suited for the various manufacturers, is indigenous to India. The forest timbers other than the few varieties of timbers generally used are scarcely known commercially. The exploitation of Indian timbers presents many commercial possibilities, which should provide a source of profitable employment for Indian labour and capital.

## MANUFACTURES IN BENTWOOD.

Take as an example the bentwood industry. In all large centres, quantities of bentwood chairs, mainly imported from Japan are to be seen in shops, public buildings, churches, restaurants etc. These are in many cases better than the Austrian variety formerly imported, being constructed on cheaper lines, and better suited to withstand the extremes of the Indian climate. The Indian forests contain several species of timber suitable for this class of work, the commonest of which in Northern India is probably Sheeshum. Chairs constructed of this timber, on account of their strength and durability and the excellent finish and appearance of the natural timber when polished, would demand a better price than the imported article.

Apart from the meeting of India's needs in this commodity there is no reason why, since these chairs can be exported in a sectional state, the supply of these should not extend beyond the limits of India. Allied to this, such manufactures as steering wheel, rims for motors, hoops for fibre, travelling trunks, rims for small wheels, high class walking sticks, and such bentwork could be under-

taken, the process of manufacture being similar in each case. Much of the labour on these manufactures, not being of a very highly skilled nature, could be undertaken by Indian carpenters.

### CANE AND BAMBOO FURNITURE

Similarly the developement of cane and bamboo furniture making could be effected. At present in Northern India, this work is not very largely done, but all products find a ready market. Considerable quantities of similar work is imported. Excellent cane furniture made in India is obtainable, but the supply is very limited and the raw material, although plentiful, is not of such a high quality or capable of receiving such a good finish as the varieties of imported cane furniture. Probably, if this industry were developed, the forest department might be able to assist in the growing of suitable cane, from which the superior products could be turned out, to compete with the imported manufactures.

Looking into the statistics of finished woodwork imported into India, valued at Rs 2047000 yearly, it is apparent that many other lines offer possibilities. Take for example wooden mouldings. These to the average value of Rs 540000 yearly are imported and distributed throughout the length and breadth of India. The manufacture of these could be very well carried out in Indian timbers. Enriched by the artistic decoration the Indian craftsman is capable of, these products would find a ready market in India and possibly farther afield.

Similarly the large quantities of wooden toys and turnery, one sees imported into India from Japan might, very well be made in India. This could be made essentially a village industry. Owing to the small light nature of these products the industry could be successfully run as a Kamaun Industry, in the hills. Excellent Raw material is procurable for this work, such hard timbers as Walnut, Holly, Maple, Utis, Haldu etc being available, also soft timbers such as Deodar, Kail, and Spruce. This, run as an industry in which families could specialize in the making of various lines of toys or parts of such, as is done in Japan and Europe, assisted by Government in the matter of marketing products, should be capable of considerable developement. The toys could be put in the market to compete with the Japanese products. Similarly in the question of



small wooden packing cases and boxes, it is deplorable that Japan should be supplying wooden boxes to India when the forests of India are capable of supplying all the needs of the country in this line.

The supply of wooden bobbins for textile industries in India, of which over 35 millions are used annually in the Indian mills valued at over 30 lakhs of rupees, presents a practically undeveloped industry. Large quantities of these are imported from Japan and Germany which could equally be made in India by Indian labour from Indian timbers

In the forest tracts at the foot of the hills power for small wood working plants might be generated from the water-falls on the irrigation channels, running through these tracts. This would provide a cheap form of power in the vicinity of the supply of raw material, which is one of the essentials in the manufacture of such goods as toys and light turnery which have to compete with imported products

Having called your attention to a few of the lines of manufactures possible in India, the question arises as to why such development has not taken place. The cost of freight, due to distances in India is extremely high but is not insuperable as the supplies of suitable raw material are scattered throughout India and the industry need not be centralized at a great distance from the markets. In any case, such imported goods are similarly handicapped. The supply of raw material for wooden manufactures is unlimited, in the forests. The solution of this question lies in the development of Technical education in India for the training of suitable skilled labour and supervision and in the exploitation of the timber wealth by the placing of timber on the market in a state fit for the various uses to which it can be put. Combine skilled labour and material and the question is largely solved.

Regarding education in general, this should be given a much more practical aspect, coming more into touch with the actual world and less of a theory, with examinations as its sole aim. Practical science, practical drawing, practical thinking, practical educational handwork in school on the principles recognized in all modern schools in Europe and America. to produce practical thinkers, is the solution to the educational question. For the higher training in specific practical branches of Industry, the establishment of Minor Technical schools as feeders to the Central Technical schools would

serve an excellent purpose. In these minor technical schools even more practical training could be provided, fitting the students to take up industrial pursuits with a brain trained to assimilate the elements necessary for the success of an industrial or business concern. As long as the general education in India follows its present lines, industrial progress will be greatly handicapped.

Technical schools specializing in the teaching of subjects or group of subjects specifically suited to the needs of existing or possible industries, complete the solution of the labour question.

Demonstration or special sections could be attached to Central Technical schools for providing instruction in specific trades. Selected candidates could be nominated by District or Municipal Boards from the districts offering facilities for the opening up of these industries. These students on completion of their course of training would be in a position to take up employment in workshops, or to act as teachers and supervisors in workshops, opened for the establishment or improvement of these industries. In the case of minor industries, such as toy-making, samples of foreign manufactures from which similar patterns could be made and supplied as models would be available at the central schools. By exhibiting manufactures in exhibitions or emporia at large centres, these goods would be advertised and markets found for such products. Government might assist in the development of the minor pioneer industries, by granting advances to such concerns on security, or by supplying plant on the hire purchase system, to selected applicants who had completed a satisfactory course of training in a recognised institution and are in a position to give security for such Government assistance.

The supply of timber at nominal rates during the initial stages would materially assist in the establishment of these industries. In the matter of the supply of raw timber, failing private agencies taking up the business, the forest department might place the timber products of the forests on the market in a state in which the large and small buyer could equally share. Thus by the establishment of forest saw mills, and modern timber seasoning kilns, the timber could be put on the market in a condition ready for use to compete with foreign produce.

Apart from the development of wood manufactures made possible, and the benefits conferred on timber users by such a system,

the forest department would considerably increase the revenue derived from the Indian forests, by creating markets for timbers now considered useless for manufacturing purposes, owing to the difficulty in seasoning them by the natural process, which owing to the extremes of climate is unsuitable for seasoning timber in India

Considering the drain on labour and timber resources which has been brought about by the present war, no time should be lost by India in taking advantage of the present situation in developing the natural timber wealth and incidentally opening up new and profitable avenues of employment for the masses of Indians, who are finding it increasingly difficult to find employment.

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# THE SWADESHI MOVEMENT.

By M. B. Sant, Esquire, Assistant Secretary Indian Industrial Conference, Bombay.

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The question of the Swadeshi movement has been so often and so thoroughly discussed on public platforms in newspapers, and other periodicals that very little now remains to be said. Yet living, as we do, in an age of short memories and numerous distractions, no subject however important or affecting the vital interests of a nation, it may be, will leave any permanent impression on the popular mind unless and until it is repeatedly dinned into their ears and its significance brought home to them by diverse methods and on different occasions. In the pregnant words of His Highness the Gaikwar of Baroda, "This economic problem is our last ordeal as a nation, it is our last chance." It behoves, therefore, every son of India to study this question carefully and to persist in reducing to practice what we have all been preaching so long. Because practice is the school of mankind and it will learn at no other.

The first faint beginning of the Swadeshi movement was made in Poona, so far back as 1878 by an old veteran of that place, Mr. Ganesh Vasudeo Joshi, who may be justly looked upon as its pioneer. He, however, failed to gather any adherents at the time, but like all truths which have the inherent property of manifesting signs of vitality, whenever there is the least favourable chance, this movement came to be revived in 1890 and was fostered by men like the late Mr. M. G. Ranade. For nearly 15 years the idea remained stagnant, until it received a sudden impetus in 1905. The credit of its revival, renewed vigour and vitality is largely due to Bengal. But the association of the movement with the partition question and certain other incidents which happened in its earliest stages about a decade ago, brought it under dis-repute. A dark cloud of suspicion hung over it, its advocates and martyrs for a time, until the light of subsequent events dispelled the awful gloom to such an extent that the Government of India has itself become now an Indian Swadeshi by advocating in unmistakable terms the purchase

of Indian goods even in preference to foreign articles by the different departments under its control, whenever possible

Now what is the meaning of the Swadeshi movement or what does it connote?

Pure and unalloyed Swadeshi is a genuine sentiment that every son of India ought to do something for the Industrial welfare of his motherland and as such this sentiment deserves to be cultivated in its intensity By dint of self-help the movement honestly attempts

- (a) To conserve old existing industries of the country by introducing all possible and necessary improvements—
- (b) To start new ones necessitated by the circumstances of the modern civilisation, to keep India as far as possible independent of foreign supplies of articles either of daily use or of luxury
- (c) To create within the country itself a permanent market for the home goods and raw products by observing a vow of self-help and self-sacrifice affording by these means a legitimate support and protection to the home industry

If there is any non-controversial subject before our countrymen, which must appeal to the patriotic instincts of all communities, irrespective of caste, creed or complexion, inhabiting this vast Peninsula, it is this Swadeshi movement The domiciled Anglo-Indian, the Parsi, the Mahomedan, the Bohra, or the Jew is as much interested in its correct solution and its progress as the Hindu. In the earlier stages of the Indian History, when India was isolated and self-sufficient, the need of this question never arose It is only owing to the impact of the Western Civilisation heralding a new era of mechanical inventions and the subjugation of the forces of nature, that the conditions of Indian life have been entirely upset and the need for protection of home industry has naturally come to be recognised

This question throws certain responsibilities on the producer and the dealer along with the consumer It is within the knowledge and recollection of many of us that in the beginning of this movement, unscrupulous manufacturers and dealers had a sole eye to illegitimate profits and were in a hurry to get rich by all possible means fair or foul They exploited the movement by palming off as

country made goods articles of foreign make by using false labels, trade marks and other devices. Manufacturers put on the market unfinished, inferior and worthless goods taking thus an unfair advantage of the movement. In fact as one of our friends has happily put it. "This movement has enabled people to sell and produce candles that will not burn, soaps that will not wash, matches that will not light, and pencils that would not write" This picture may appear to be over-drawn. But it must be conceded that there is much truth in this statement and it teaches us that any movement based on sentiment alone can never last long, unless it is nourished by other factors equally sound and encouraging.

Want of expert knowledge in the Bankers Manufacturers, Engineers and traders, low commercial morality, impatience to get rich at the cost of one's own countrymen, shyness of capital, starting of industrial ventures without proper and sufficient investigation, lack of advertisement of goods for the purpose of creating markets either in the country or abroad—these and many other causes, some within our own control and some beyond, contributed to the fall of Swadeshism and unless steps are immediately taken in the right direction, there is no prospect of an abiding success of the movement.

#### OUR DUTIES

Our first and foremost duty is to organise and combine. Those who loudly complain of the industrial invasion of Japan since the commencement of the present titanic struggle, forget the fact that Japan does not believe in talk, platform speeches, lengthy discourses and discussions, more or less of an academical nature, but in action, pure and simple. It is a country of cottage industry properly organised on the principles of combination and co-operation, without the aid of costly machinery and in most cases without bounties or other forms of government help. In Japan, the mill-owners and other big as well as small traders form combines and by united action succeed in underselling articles in foreign countries, in a way which makes it impossible for them to compete with Japanese goods.

To ensure success of the Swadeshi movement, it is necessary to patronise existing industries, and also to start new ones to suit various centres in India. There is ample scope in the country for the expansion of the hand-loom and diverse other occupations,

The following measures should be adopted for the purpose of creating a market for indigenous products at home and in foreign countries.—

- (a) For home market, shops should be opened in all important centres and in every town for the collection and sale of only countrymade articles. The Directory of Indian Goods and Industries compiled by the office of the General Secretary Indian Industrial Conference will afford much help in organising these shops.
- (b) There ought to be standing exhibitions of indigenous goods and productions of art at least in the principal cities of India.
- (c) It is necessary also to collect specimens of foreign goods of various description which should be kept on view for the instruction of artisans and others desirous of studying them for the purpose of producing similar wares. This system has already been adopted by Japan and has produced excellent results. The Commercial Intelligence Department of the Government of India has organised Museums for the exhibition of Indian as well as foreign articles.
- (d) Determination on the part of the people to buy genuine Swadeshi articles in preference to foreign goods, even if the cost is slightly higher.
- (e) To organise exhibitions of machinery large and small which is actually used in foreign countries for the manufacture of different articles of daily use. These Exhibitions of the processes of manufacture will be of greater practical utility than the exhibitions of Indian articles organised now and then in the different parts of the country.

For the success of the Swadeshi movement and the diffusion of the Industrial ideal, there ought to be extensive schemes of Scientific and Technical Education undertaken either by private agency or Government departments. In addition to these, a nation, bent seriously upon industrial advancement, must prepare its younger generation for manual work, which should not be looked down upon, but assigned even a higher place than that of the merely literary and unproductive careers. Unless there is a

harmonious and genuine combination of capital, brain, earnestness and sincerity of purpose, there can be no industrial progress

These are only a few of the essentialities of modern industrialism, which cannot be lost sight of

My remarks on the abuses of the swadeshi movement and on the causes of its failure are likely to make some of you despondent in regard to the future of this activity. For their sake, let me at once make myself clear on the subject by stating that those remarks represent only one side of the picture. Let us not ignore the bright aspect of the movement and the marvellous transformation which it has made both in the ideals and the actual life of the people. About twenty years back, gentlemen who could afford owing to their affluent circumstances to send their sons or relatives to foreign countries for training, invariably selected the I. C. S. I. M. S. and Barrister's courses, but a change has since then come over the popular feelings, and wealthy persons or public associations started in the various parts of the country choose mechanical, or electrical engineering, textile engineering, Pure and applied chemistry, agriculture and other technical courses for their students. The Government of India has allotted a certain number of scholarships purely for technical education. As a result of this impetus, those places and posts which were formerly occupied exclusively by the foreigners, are now in the hands of Indians. The Society for the Advancement of the Scientific Education started in Bengal has alone sent nearly three hundred students so far to foreign countries solely for technical studies. The commendable activity of this as well as other similar institutions all over India and the co-operation of the Government of British India and Indian states, have already borne fruit. There are now in the country experts in glass making, paper and paper pulp manufacture and some other industries and also men capable of undertaking geological surveys and mining industries. We possess a number of Electrical and mechanical engineers trained here as well as in foreign lands. Our spinning and weaving mills are run by our own spinning and carding masters and dyers. In the forest research work, our chemists and experts are working on equal footing and side by side with European officials. In the agricultural department, we have got our own botanists, entomologists and chemists showing equal aptitude in research and organisation with their European confreres. I have seen Indian Engineers in charge of Steamships of the Indian Naviga-



tion Companies Many of you who have not paid much attention to industrial problems, will be surprised to learn that high class gentlemen have chosen deliberately leather tanning and other despised professions and careers for their sons who are B Sc s, of Indian universities Can the Swadeshi spirit go further ? Yes, there is yet in the country a portion of the younger generation which shows an aversion to any profession or avocation requiring manual labour So long as this feeling lasts, do not dream of your economical emancipation. In other countries, sons of millionaires will not shrink from working as coal heaveres in the mines owned by their own fathers Let us take this lesson to heart

The starting of Swadeshi shops in principal cities, has given much impetus to this activity as each shop is a standing Museum of country made goods

In the midst of the gloom cast by the regrettable failures of our banks, there are also several features which are distinctly reassuring The colossal enterprises started by the distinguished sons of the late Mr. J N Tata with the aid of funds raised in India, I mean the Steel and Iron works and the Hydro electric schemes of Bombay Presidency, are an emphatic answer to the charge sometimes laid at our doors, that we are efficient in the capacity of organisation and combination

According to some pessimists, we may not be able to show a distinct advance owing to the vastness of our country and the meagre information that we possess regarding our own activities We may be moving in a circle, but that circle is continually widening and bids fair to encompass the whole world within the domains of its activities

There was a time not long ago, when our dhoties used to come from Manchester, Boots from Dawson, socks and shirts from Whiteaway, Laidlaw and Co But now thanks to the spread of this movement and the energy and enterprise of our Bombay and Ahmedabad mill-owners, a prince as well as a peasant can now be dressed from head to foot in an attire which can be purely Swadeshi

If that is the case, may we not hope that captains of industry and all who attend future Conferences and Congresses, which include the Swadeshi in their programme may set an example to their countrymen by appearing in a dress composed entirely of Swadeshi manufacture ?

India occupies a unique position on the globe. Blessed with fertile soils, an equable climate, favourable for the production of an abundance of raw materials, with an inexhaustible mineral wealth, India was and is still capable of meeting her own wants by producing articles of every day life. Yet it presents in the words of a well-known writer, the "strange spectacle of a country formerly rich, prosperous and civilised, but now with many of its industries on the border of extinction." The only way to solve our economical difficulty is by being Swadeshi. The right of civilised citizenship implies freedom of purchase and use of commodities and if Indians in their patriotic zeal for the revival and development of indigenous industries, prefer home made goods to articles of foreign origin, there is no cause for despondency and the swadeshi movement may yet prove an unmixed blessing.

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# The early history of Co-operative Credit, its main principles and advantages and their application to India.

By Babu Shrivacharan Lal, of the Co-operative  
Credit Department, Gwalior

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It was in 1849 that a reformer named, Raiffeisen conceived the noble idea of a Co-operative Credit Society This great man was a native of the country, which is our deadliest enemy in the present war, and while we heartily wish that some of the misnamed master-minds of the age, in that part of the world, had not been born, we cannot but bless a Luther, a Schopenhauer, a Raiffeisen and a Max Muller Raiffeisen's scheme of a Co-operative Credit Society was met with derision and contempt, as had been the fate of many originators of new ideas in diverse spheres of human activity Buddha, Ptolemy, Columbus, Tolstoy, Ram Moham Roy and a galaxy of other flag-bearers of humanity had been similar victims of prejudice and ignorance But like those lofty spirits, Raiffeisen stuck to his guns, proclaimed his scheme of a Co-operative Credit Society from the house-tops and finally succeeded in bringing together small bands of agriculturists and other labourers who lived in close proximity to one another and were fully conversant with their mutual needs and character to obtain credit by mortgaging their joint responsibility and unlimited liability The uses to which this credit was applied were supervised by the lynx eye of an elected Committee of honorary workers in each Society and the result was an unmitigated triumph of Co-operative principles There are at present some 30, 000 Co. operative Credit Societies working in Germany, or in an area equal to that of one of our largest Indian provinces. Other Co-operators subsequently appeared in other States of Europe, and Schulze-Delitzsch, Luzzati, Wollenburg and others promulgated their schemes of a Co-operative Society which, though they differed in detail from that of Raiffeisen, were yet generally based on the same principles, and the latter deservedly remains, what he really was, the Father and Pioneer of Co-operative Credit in Europe. All these banks which are associated with the name of one or other of

these wellknown Co-operators belong to the same hierarchy, the underlying principle being the same, the propelling force the same, and it is a sad mistake to accept or reject one or other type, simply because some bogus and ill-informed Co-operators opine temporarily for or against it, just as Parisians frequently change the fashions of their dress.

In India, the credit of being the first worker in the field of Co-operation belongs to the Madras Government which deputed one of its talented officers Mr ( now Sir Frederick ) Nicholson, in 1892, to study the conditions and principles of Co-operative banking in Europe. Subsequently the U P Government under Sir A. P. ( now Lord ) Macdonell placed one of its officers on special duty to report on the future possibilities of Co-operative Credit in these Provinces, and some district officers in the Punjab, the U. P and Bengal, started a few Credit Societies, of sorts, at their own initiative. The Imperial Government now realised that special legislation was needed for the spread of the movement, and a very competent and influential Committee was appointed under Sir Edward Law to submit proposals about the suitability of Co-operative credit to this country. The Committee urged that Co-operative Credit was most suited to Indian conditions, they drew up model schemes of working rural and urban Societies, and their recommendations culminated in the passing of the Co-operative Credit Societies Act of 1904, which has since been repealed by Act II of 1912.

Some people have a knack of talking glibly and mysteriously about Co-operative Credit Societies, and their talk is generally based on ignorance or improper understanding of Co-operative principles. Co-operative Credit is nothing but business of the simplest sort, adapted to special environments, and the chief functions of a Co-operative Credit Society are to make a comparatively cheap and easy credit accessible to its members, to exercise such supervision over their borrowings as may discourage improvidence, and to inculcate in them the virtues of thrift, self-help and self-denial. In the words of M. Luzzati, Co-operative Credit " Capitalises honesty ", makes it a pledgeable commodity, secures an immunity against bad debts, paves the way for large Savings banks and tends to bring people nearer to that terrestrial Paradise, in which cash might become a freely purchaseable and

saleable article Its other advantages are, that it adapts itself to the condition of the people in whom it works, whether they be living on the banks of the Rhine or the Danube, the Ganges and the Jumna, the Brahmaputra or the Indus, the Nile or the Mississippi Usury trembles at the sight of real Co-operation, and the latter tends to increase the price of corn to the cultivator by protecting him against compulsory sale in a dull market.

Persons in affluent circumstances, or in possession of some property and credit, will always prefer to go to joint stock banks for greater ease and privacy, but to the poor primitive cultivator and crude Artisan of India, to whom Rs 5 is often a handsome amount and Rs 15 a thing to be coveted, Co operative Credit Societies are an unmixed blessing These Societies work with a comparatively small capital by generally advancing short-term loans and insisting on timely and prompt repayments, but unfortunately many societies which have adopted the appellation "Co-operative" to catch the public eye, are anything but Co-operative in spirit, and one could sanguinely wish that there were more of true Co-operation than such pseudo-Co-operative Societies

The Committee on Co-operation in India have recommended in their report that "the first condition" of forming a Society should be that "every member should have a knowledge of the principles of Co-operation, if this Co-operation is to be real and not a sham" and that "the Registrar should only consent to register a Society after he is convinced that its prospective members understand Co-operative principles and duties and are prepared to act up to them" There can be no two opinions about the reasonableness and necessity of this dictum, but it is an open secret that many of our Societies in India—and we are told by Mr Henry Wolff that even in Europe—fall much below the true Co-operative standard It is certainly not a salutary policy in Co-operation to make understanding subservient to faith, but as long as the illiterate peasants and artisans of India are what they are, some bottle-feeding will have to be done in the interests of the people themselves

We are generally addicted to attach undue importance to Rules, but they are a secondary thing, the chief thing being the real Co-operative principle Forms sometimes must, and do, change to suit the peculiar requirements of the people in each province or country. as our own original Societies in U. P had to be modified to respond

to the habits and needs of the people, but the Co-operative foundation must remain intact. In some countries unlimited liability so much startled the people that a beginning had to be made with limited, in others shares were altogether dispensed with, while in a third instance compulsory deposits were made a condition of membership.

Co-operation is a thing not to be learnt by rote, and there is no royal road to success in this as in any other matter. The foundation must be strong, no matter if the success be slow, and zealous co-operators cannot do better than bear in mind the Latin phrase "festina lente" (hasten gently) quoted by the Registrar C. P. in his report for 1914-15, as an "excellent motto."

Agriculture is the first thing which should claim the attention of Co-operators in India, and this statement is fully borne out by the recommendations of the Committee on Co-operation. There seems to be a bright future in store for Co-operation in India, and to quote from an article from my pen which appeared in the "Leader" of the 16th November 1916, we are anxiously looking forward to the time when "organization for purposes of credit will lead to concerted action in other important matters when primary education, sanitary measures, medical and charitable relief will all claim the attention of the Village Society," and "when our Village Co-operative Societies will be on a miniature scale the replica of our larger Municipalities which enjoy the advantages of local self-government."

There are at present some 15,000 Co-operative Credit Societies, mostly rural, working in British India, nearly all the important and enlightened States of India, such as Hyderabad, Mysore, Gwalior and Baroda have also introduced and extended the principle of Co-operative Credit within their jurisdictions, and the writer has good reasons to believe that the Kashmir Durbar is also shortly to follow suit. These Co-operative Credit Societies, coupled with a slight relaxation of demand on the produce of the cultivator will, in course of time, tend to materially improve his condition, and the time does not appear to be far distant when the Indian peasant will boastfully repeat, as he did in the days of yore, the time-honored maxim

उत्तम खेती मध्यम वज्ज, निष्ठष्ट चाकरी भीख निदान

Translation — Best is tillage, middling trade

Base is service, begging worst

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# Insurance Drain on Indian How to Prevent it.

By Mr. W. T. Halal, Bombay

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Now-a-days, the columns of newspapers are full of suggestions regarding the Industrial Development of India after the war. The Government of India have on the motion of non-official members of Council appointed a Commission of enquiry with Sir Thomas Holland as its Chairman to ascertain in what direction Indian industries can be developed, and how the regeneration of poor India, that is no longer able to bear the brunt of the heavy drain falling on her resources, can be effected. To my mind, the industrial development on a gigantic scale consistent with the productive capacity of the country requires—

- (1) large capital,
- (2) up-to-date machinery,
- (3) exploring experts. and
- (4) skilled labour

The Indian Civil Service portion of the ruling community of the day has always been assuming that India is wanting in enterprise, and that the people of India are able to do nothing.

It is perfectly true that India has grown poor by the very heavy drain that is falling on her resources. So far as manufactures and up-to-date machinery are concerned, India as she stands at present can boast of none. She did possess exploring experts, but they have now disappeared. And as regards the skilled labour of India for petty crafts, she did possess a considerable amount of it for small indigenous industries, but unfortunately, those industries have been forced to die an unnatural death by reason of the preferential treatment and the very great facilities that have been accorded to the foreigners and their industries, with the result that at present India is solely dependent on others for even the daily necessities of life. The country that was supplying to the civilised Romans the finest of muslins and various sorts of spices and chemicals has had to depend for common things like table salt upon Spain and Liverpool. All her raw products are taken away, and even the material for the production of such raw products, the best of manure, is not allowed to

remain in the country. And latterly, her mill and other industries have to depend for ordinary refined articles like China-clay etc on foreign countries. Very often before the outbreak of war, and since then, I have made suggestions through the medium of the press, that have always been charitably received.

Shortly after the outbreak of war, I suggested in one of our local contemporaries when the prices of stores and other accessories were quoted at fabulous rates, a list of articles which could be very easily manufactured in India, and I appealed to the Mill Owners' Association to start either a Company or an Association or a co-operative store of their own for supplying to each of its members the particular articles to be manufactured by and under Indian supervision and direction. I then pointed out that such co-operation would in no way interfere with a healthy competition in their products *inter se*. But what they could not do for themselves, Japan has already done to them. I have no means of knowing as to whether all the products that Japan has supplied are of her own manufacture, or whether the same have been exported by her after taking the tremendous (!) labour of re-labelling the articles manufactured either in America, or even perhaps the countries of our enemies.

It is no use crying over spilt milk, because in my personal talks with some of the luminaries of our industries, who while admitting that the suggestion made, was quite workable and feasible, found it difficult to be put into operation because of the conflicting interests existing in their Association. One really does not understand when we shall do away with our personal conflicts, and why we cannot unite as a nation at a time when we—and our rulers are face to face with a stupendous struggle. If the mill owners would only look at their own records, they would notice that in the year 1905 they shipped to China 10,085 packages of piece-goods in addition to the thousands of bales of yarn that were being shipped, in the year 1913, that is, before the out-break of the war, the said shipment has now dwindled down to 638 packages only! But the period subsequent to the last mentioned date shows that it is China that is exporting to India piece-goods in very large quantities. Just in passing, may I be allowed to cast a glance at the land of the Rising Sun—Japan, our ally? In the year 1898-99, she exported to India only 9394 yards of cloth, whereas her exports in the year 1912-13 reached the



stupendous figure of 58,80,723 yards Comparison is invidious, but the figures speak for themselves

I fear I am rather growing irrelevant My subject is the insurance drain But I think these industries about which I have written are so very closely allied to insurance that I have not been able to separate the one from the other It is the mill industry of Bombay and India which pays the Insurance Companies the highest, premia being one of their fattest customers Insurance companies have a special code of tariffs, and tariff rules for them, which cover not less than about 150 pages of their tariff book The rates that mills pay for the insurance of the various parts of building, machinery, plant etc, vary from two annas per cent per annum to 56 annas per cent per annum—a ratio of 1 to 28 It is just possible that many mill-owners or agents may be or are the agents for insurance companies also, and what work they are in a position to give to the insurance companies, or rather to put it down against the insurance companies, requires for them neither any big capital, nor up-to-date machinery or skilled labour And, may I place before my readers a rough estimate made by me with regard to the city of Bombay alone about the insurance premia? It is no less than two crores and seventy five lakhs in Fire Insurance alone! Of course, I know that the insurance companies give a rebate or return commission to their customers of 25 per cent They are probably paying about 10 to 12 per cent to their brokers and canvassers, and an equal sum or perhaps something less, to the agents But there will be no heresy in assuming that a minimum sum of a crore and fifty lakhs goes into the coffers of foreign Fire Insurance Companies It is not my purpose to discuss in this article either Life or Marine Insurance Even a mill of moderate output has had to pay 20 to 25 thousand rupees on this item alone Next comes the selling agent who has to pay the premia for the goods that he holds on behalf of the mills That is again followed by the insurance payable by the merchant purchasing from the selling agent and taking delivery, and a fresh insurance arises when the goods have to be in transit for sale up-country and consumption

For the year 1914-15, the Assessor and Collector of the Bombay Municipality collected Rs. 50,73,341-8-9 by way of general tax on buildings from its rate-payers on 61,990 buildings Deducting 25 per cent for the rental of the land, this tax for the buildings alone roughly works out at Rs 37,50,000. Taking the general tax at 10

per cent—it is now  $9\frac{7}{8}$  per cent—the rental works out at 3,75,00,000, and the building value calculated at  $16\frac{2}{3}$  year's purchase will give a valuation of Rs 62,50,00,000. If we allow 12,50,00,000 for uninsured properties, it still leaves property worth 50 crores to be insured. The rates vary as already stated above. Even if we take the average rate, which will be the minimum at half per cent, the premia income will come to 25,00,000.

The next item that claims our attention is cotton. Readers know the tremendous quantity of cotton that is being brought to Bombay and the inflammatory rates of premium, which the Insurance companies are charging since the last Colaba fires, speak for themselves. All imported piece-goods and other articles of merchandise, such as grains, cereals, stores, etc., are insured and in regard to these, heavy premia are payable. The amount of premia would be considerably in excess of my calculations.

So far as I am aware, there are not even half-a-dozen purely Indian concerns in the field of insurance throughout India, and those in Bombay are hardly getting one per cent of the total out-turn. As far as I have been able to ascertain, there are no less than 67 foreign Fire Insurance Companies, and naturally the cream goes to them.

May I ask what skilled labour and up-to-date machinery is required for working this branch of commerce and for preventing the enormous annual drain of money which is involved by foreign exploitation?

But India is still under greater disabilities and disadvantages. Many readers may not know what mischief our enemies have played in this direction. It would not be out of place to draw their attention to what the Insurance correspondent of the *London Times* wrote very recently. His remarks may be summarised as follows.—

“It appears that before the war many of the leading English Insurance companies were in the habit of reinsuring with several large German concerns, having their headquarters at Munich and other places. These German concerns used to offer excellent terms, and only asked for full particulars as to the situation, mode of construction and so forth regarding the proposed buildings and the same were invariably supplied to them. Would we be wrong in assuming that those particulars were really required for the benefit

of our foes and their Government, and do they not to some extent at least account for the wonderfully detailed knowledge the enemy has displayed of our affairs?

If only one *Emden* could in her first attempt succeed in setting ablaze the oil tanks at Madras after a bombardment of a few minutes, what further advantages would the enemy not have secured when he has been allowed the fullest opportunities of knowing the minutest details with regard to our lands and buildings? And where does the safety of India lie in allowing foreign insurance companies the latitude which they hitherto have possessed? I might only give one instance of how on the occasion of the Laxmidas Market fire in Bombay, I was told that a particular foreign company that had taken insurances, and was pocketing fat premia, intimated to its agents in Bombay the very next day after the occurrence of the fire that it had shut its doors and had crumbled down like a pack of cards

To come to the constructive part of my subject, the scheme which I propose is a very simple one. In Bombay we have many influential offices which have to pay lakhs of rupees annually by way of premia. Take for instance Messrs Tata, Sons & Co. I think they own properties under their management and are probably paying premia over properties, worth at a modest estimate of 12 to 15 crores of Rupees. Messrs Currimbhoy and Company similarly own seven to eight mills, and in addition thereto other large properties. Messrs Mathuradas Gokuldas and Company have under their management several mills and the Khatau brothers and Messrs Morarjee Gokuldas and Sons each own a couple of mills and other properties. In Bombay we are not wanting in big financiers, nor are we wanting in insurance experts, possessing the necessary knowledge, skill and enterprise. Insurance brokers are all there, and if they are allowed the same facilities as agents of foreign insurance companies give them, I see no reason why they should not work for any indigenous insurance company or companies that may be started. If capital worth crores of rupees has been available for starting gigantic projects like the Tata Hydro and Tata Iron Works or for starting Banking Companies, Mills and other concerns, I see no reason why the comparatively small capital, say of Rs 50 or 60 lakhs, for starting a few insurance companies should not be forthcoming. To do business on a large scale, these companies to be started anew may for sometime have to join the Tariff combination

for the purposes of re-insuring and reducing their risk. But as people will see the advantages of it, this branch of commerce is bound to thrive with honest and business-like management and prompt settlement of claims in the event of accidents

If these companies would also with competent men open their branches in other important centres, and if all such concerns and companies are controlled by a general board of competent financiers and experts, there is no reason why they should not prove successful. Honesty would inspire faith. Commercial integrity would encourage them, and prompt settlement of claim without unnecessary suits and litigation would in course of time swell the number of customers. Here lies the key to the success of this branch of commerce. If we look into the history of foreign companies, we shall find that they have made their beginnings with capital far smaller than what I have suggested here. A company with a capital of between 5 and 10 lakhs working in co-operation with half-a-dozen similar companies would be in a position, in the course of a few years, to save a considerable part of the drain.

At present we are also placed under further disabilities. Foreign companies are amending their rates and modifying their terms at their sweet will and we are perforce compelled to submit to them and their usurious methods. Even if the newly started companies do not make big profits in the beginning, I am quite sure that by their co-operation they will be able to do good business which will be less risky. Mutually they can among themselves feed a part of the furnace. As they are themselves working as agents for some foreigners, why should they not do it as principals? At a very moderate estimate, the companies worth 50 lakhs can in different centres and localities take up 20 times the risk very easily, and taking average insurance premia at one per cent, the annual return will be at least 10 lakhs. But we have not to look to the immediate returns but to the future development of this enterprise, and then with branches up-country and competent canvassing, watch-dog managers or agents and upright surveyors, I have little doubt of its ultimate success. The suggestion is there, but it wants willing brains to work it out. Many a mercantile community has degenerated from merchants to mukadams or has taken to menial service. Can they not turn their eyes in this direction and save the country from this unnecessarily wasteful drain?

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## On Life Insurance in India.

By P C Mukerji Esqr, Chief Agent, upper India  
National Indian Life Insurance Co Ltd, Lucknow

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Life assurance like every other form of insurance is merely a contract of indemnity to indemnify the insured person the loss sustained by him on the happening of the event insured against in this case death-but unlike other forms of insurance, it is not usually possible to reduce to a monetary value the actual loss sustained. It behoves life offices, therefore, and ultimately, if necessary, the law-courts to watch that people do not assure their lives out of all proportion to their means and position in life nor gamble on the lives of others by whose deaths they incur no loss. In its earliest days, the life assurance contract was of the simplest nature, merely in consideration of the payment of the premium or subscription, a fixed sum or a proportion of the accumulations was paid on the death of the assured, no surrender value or other return in the event of discontinuing the premium or share in the profits made being allowed. In process of time, however, in deference to competition and from a sense of fairness, all the various concessions and privileges now enjoyed were gradually evolved, the endowment assurance and other special forms of policy being later and natural developments. By means of these, a life policy has now so developed from the simple death-indemnity, that it originally was, that by a combination of different forms of assurance and annuities, it has now generally become a remunerative and attractive form of investment, which it is difficult to equal or surpass by other means, in addition to the death-indemnity, more particularly for the rich man to whom the family provision is a secondary consideration and who can afford relatively large sums for investment. Practically every conceivable contingency can be met and provided for by various combinations. Only too frequently, however, people forget or ignore the primary or main outstanding object of life assurance and regard it too much from the personal and investment point of view. This does not so much matter for the man, who takes a policy mainly as an investment and to whom family provision is a secondary consideration, but how often is or should this be the case? With

the rapid spread of education in these days, it should hardly be necessary to have to emphasise the extreme utility of, nay, absolute necessity of life assurance as a death provision in the case of the very large majority of the inhabitants of any country and while in the abstract few people would wish to deny this, when it comes to the personal and practical application, how many fail to act up to it? The various poor laws or their equivalents the numerous charitable institutions, orphanages, private charity, the recognised necessity for State or compulsory insurance and pensions—all these have been introduced in European countries and yet in spite of all these, the widespread want and distress known to all, is a convincing and incontestible proof of the fact, if any proof is wanted, that life assurance alone, can provide a remedy for this state of affairs. Thus life assurance has a National and Imperial aspect as well as a personal one. This war has proved that the individual must sink his individuality and that all must work together for the good of the State, even at some personal sacrifice. Fortunately in the matter of life assurance, the process is simplified for the individual, as he only needs to look to the good of his own family in order to best serve the State. If this principle is in the main conceded, then it follows that no man without sufficient private means has any more right to refuse to assure his life than he has to refuse his family bread, and he has in fact no right to refuse to assure it for any smaller sum than that which will maintain them in a position in which they have been brought up. Some would object to this by saying, "That is excellent in theory and life assurance is an excellent institution, but I personally cannot afford it." My reply to that is "You can and must afford it and you would find the way, if you thoroughly realised your duty and acted up to it." If your wife or child gets ill you do not sit down and cry that you cannot afford to call a doctor, but you simply call him in and by self-denial or otherwise so re-arrange your affairs as to be able to afford his help. So too in other matters in which your own immediate personal interest is concerned. But the man who knows that if he were to die tomorrow or next month or next year, his wife and children would be reduced to straitened circumstances, if not to actual want, what right has he to ignore the fact and be satisfied without making any effort. Remember that however poor a man may be, there is always some one else who is poorer. He almost certainly has friends who have a smaller income than himself and yet they manage to pull along

semehow and very often just as comfortably as he does himself Emulate their example and the necessary margin for a life policy will find itself If man knew that he could absolutely avert poverty by so simple and so cheap a means as a life policy, do you believe that he would still plead inability? I very greatly doubt it It is not pleasant to realise it but if one looks facts straight in the face, I think one must admit that the man, who goes his own way, day after day, knowing full well that his wife and family are wholly or insufficiently provided for and is content to silence his conscience with the old plea of inability, is nothing but a selfish coward, the worst enemy of his kith and kin Whether he so acts wilfully or thought-lessly makes no difference If it were the man himself who was to suffer personally for his neglect after his death would he ever rest until he had done everything that lay in his power to provide for it? I think not The ease of mind engendered by the knowledge that comes to a man when his dear ones are provided for, will in itself be found more than an ample recompense for any sacrifice involved and will not a little strengthen him for the battle of life both morally and physically One thing more, having secured your assurance hold on to it Never allow yourself to be induced to let it go unless you are satisfied that you can secure a really better policy elsewhere and even then secure that better policy *before* you let the other go It is hardly necessary to expose the common fallacy that a provident fund or private savings are an equivalent of a life-policy They might be, provided you could guarantee that you would live 20, 25 or 30 years or so, and could be certain of your ability and willingness to send your contribution or saving regularly and without a break, but not otherwise They are both excellent in themselves, but make certain of the future by getting the life policy first and then by all means invest your surplus as you will

Some one may say "All that is very true, but it is not every one who can assure as life offices always decline some risks". That unfortunately is only too true but even then the fault lies very largely with the public Investigations into the subject have led to the conclusion that in the large majority of declinatures, delay has been one of the chief factors Many a life which has been declined today would have been accepted, if it had been proposed yesterday Further, if every man in our ideal State proposed for assurance, it is more than probable that an assurable value of some sort could be

assigned to every life Life assurance is based on the law of averages and if a sufficient number of lives were to offer, good, bad and indifferent, it is almost certain that it would be found possible to ascertain rates at which practically every life could be assured

The special form of assurance, known as Industrial, which is making great headway in Europe and elsewhere, has hardly as yet even been seriously attempted in this country and for technical reasons, it would hardly seem to be at present within the bounds of practical politics except perhaps to a very limited extent in specially selected instances This is all the more regrettable as probably in no other country is such benefit more needed than in India But with the spread of education, it is not too much to hope that a way may be found to overcome the many and manifest difficulties This fact, however, in no way lessens the duty of every one to do what in him lies towards the evolution of our ideal State in which poverty and destitution will be at a minimum

In conclusion a few hints might perhaps be offered to those who realise their duty

When choosing a life office in which to assure, don't be guided solely by the cheapness of the actual premium "Cheap and nasty" sometimes applies to life assurance as to other matters and a selection based of cheapness of premium alone may very possibly prove the most expensive in the long run The few rupees saved now in premiums will not make any real difference to your mode of life but they may mean a difference of hundreds or perhaps thousands of rupees ultimately to your wife or worse still even the difference between something and nothing

The customary advice about examining the accounts and particularly the expenses of a Company is all very good but is usually hardly practicable To begin with, a life office's accounts are of necessity different to those of an ordinary business venture, being highly technical and not easily intelligible to an ordinary man. Such inferences as he may draw are as often as not quite incorrect. It is much better for the man in the street to select an office that bears a wide and good reputation for stability, soundness, straightforward and liberal treatment, simply on the ground that it bears such a reputation It probably does not do so without justification.



Do not choose an office just because it is Indian. There are good, bad and indifferent Indian Life Offices. Make sure that it is a good one. If you cannot do this, then go to one of the old-established British offices instead. They will not fail you.

If you are required to pay an extra premium, don't imagine that you know more about it than the Directors and management or that they wish to insult you. Remember that the office is most desirous of getting all the business it can and it is not likely therefore that they have asked you to pay more than usual just to insult you who are probably a complete stranger to them or for the fun of the thing. Remember also that the ordinary rates are for the average standard of life and that even though you may feel yourself to be in the best of health at present, and quite possibly the office would be the first to concede that also (they would probably decline you straight out if it was not so), there are very many other factors, such as family history, surroundings etc., etc., which may tend to lower the risk on your life to below the average standard. It is not your fault and is in no way derogatory to you, so there is no need for you to take offence. The proper selection and classification of lives for assurance purposes is highly technical and requires years of experience and so it is probable that the management and medical advisers will arrive at a truer and more impartial opinion than you possibly can yourself. Lastly remember, that the very fact that your life is for some reason considered by competent judges below the average, is a proof positive that you need assurance more even than the average man.

In the same way, if your life is declined try another office. They do not follow each other blindly like sheep and it does not necessarily follow that because one office has declined your life, all others will, but do not conceal the fact of the previous declinature as that would be fatal.

Never conceal any fact, however trivial it may seem to you. The office will very possibly find it out sooner or later and may repudiate or cancel the contract on account of it, merely for the attempt at concealment and its suggestion of malafides than for the actual fact concealed.

Once you are assured, never give it up, until you have actually replaced it by another policy that is really better. If any one makes

suggestions to you to this end, insist on knowing where his interests lie and what he will gain by the suggested change. With very few exceptions, it is certain that he is thinking of and working for his own advantage not yours.

If you get into temporary difficulties, don't borrow on your policy except as a last resort. Do so however if it is really the only way in which you can keep it alive but repay the loan as soon as you can. Remember the harder your financial position is at the moment, the more valuable is your policy and the worse it will be for your wife, should you die now especially if you let your policy go or burden it with a debt. Therefore cling to your policy as you would to life itself, for it is the only substitute for your life, and generally a very poor one which your wife has.

If you are forced to surrender your policy or to take a loan, DON'T imagine that because you have not died, the whole amount of the premiums which you have paid has been accumulated by the office without deduction and that you are entitled to a refund of the same or to a loan of that amount. If you have not died, others have and their policies have been paid. This is only possible by contributions from the premiums of all policy-holders in which contributions your premiums have joined.

DON'T assure in an office that promises as surrender value a return of 50 percent of the premiums paid or other extravagant proportion as such cannot be done by any office that is honestly and efficiently managed. An office therefore that will fail you in one direction will almost certainly fail you in others. A surrender value is not an empirical amount arbitrarily fixed, but it is in practice such portion of the premiums paid as is left over for accumulation after contribution of its share to the death-claims of others and office-expenses generally; and the experience of all good offices goes to show that nothing like such extravagant percentages can be accumulated as a reserve against any particular policy; more especially in the earlier years of its existence, after which it is rare for a policy to be surrendered. The assured has learnt to appreciate the true value of his policy by that time and is too wise to let it go.

When you do assure, do so for the largest amount that you think you will be able to keep up. You will never again be able to get it so cheap. Your wife is probably accustomed to little

luxuries etc. and there is no good reason why she should be deprived of them or be dependent on relations for them, if you can provide them for her.

When your premium becomes due, pay it at once and DON'T wait until the grace-days are about to expire. You have absolutely nothing to gain but on the contrary everything to lose by so doing. Any insurance man can mention concrete instances in which the practice has led to the loss of the provision at the very moment when it was most required.

When claiming the amount of a policy from the office, remember that there are legal proofs and formalities upon the due performance of which the office is bound to insist, indeed it has no choice in the matter or power to dispense with them. Don't imagine that it is trying to cheat you or is deliberately putting difficulties in your way with a view to delay payment. Just do whatever is required of you as quickly as you can and you will find that the sooner you are in a position to come to a settlement, the better will the office be pleased.

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# Rusa Oil Industry.

By H. R. PITKE Esqr

Prices Current Inspector, Akola ( Berar )

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The main industry of Berar is agriculture including Cotton, Sugar-cane, Tobacco and other crops Cultivation of Sugar-cane is very limited, while Cotton plays the most important part in Berar agriculture There are also a few small industries other than agriculture, which employ only a limited amount of capital and are working pretty well.

(1) Brick works, (2) Tile making, (3) Toy Making, (4) Making of Combs, (5) Lac refining and dyeing, (6) Indigo dyeing, (7) Al-dyeing, (8) Dyeing with Barks, Flowers and fruits of different trees, (9) Wood carving, (10) Stone carving, (11) Extraction of Soda from Lonar lake deposits (12) Extraction of Oil from Cotton-seed, Linseed, Til Jagani (Gingilli) and Caster seed and also from Bakana Nim-tree seeds, Karanjı seeds &c (13) Paper making, (15) Rusa Oil Industry.

These cottage or village industries are in some cases conducted on refined principles but with small capital. They are yet able to hold their own in the midst of a fearful competition due to the introduction of steam power

I have closed this year the "Rusa Oil Industry" with a view to suggest its improvement with the aid of steam power This industry is being successfully carried on in the Melghat Taluq of the Amaraoti District since about 1894 The Tahsil place is Chikalda which is known as a sanitarium where the office of the Deputy Conservator of the Forest is located It is 32 miles off from the Railway Station which is Ellichpur Chikalda forms part of Govil Garh Fort which is a famous historical place The Taluq is bounded by Nimar and Betul Districts of C P, Akola, and Buldana Districts of Berar, and the Khandesh District of the Bombay Presidency The chief facility for the progress of this industry in Berar is the abundance of raw materials required for it

### *Management.*

At present the Forest Department auctions annually the right to extract oil from Rusa grass in the District and the lessors either do it personally or sublet it to the petty contractors from whom the lessors get the oil at a fixed rate of Rs 4 or 5 per seer. The Sub-contractors hire copper or iron pots having a capacity of 40 to 60 gallons. These pots are called "Deg" which is a flat bottomed cylindrical vessel, the height being about  $\frac{3}{4}$  of the Diameter. The Rusa grass is generally collected and brought by servants or sometimes brought by contractors and stacked before it is put into the still.

### *Still.*

The still consists of a chulla or an earthen fire-place, simple in construction, but its size is large enough to accommodate the pot and has a wide opening in front. Its height is about  $\frac{1}{2}$  feet from the ground and it is generally built on the banks of running stream.

### *Process*

There is a hole in the lid of the "Deg" into which a hollow bamboo pipe about 1 foot in length and two inches in diameter is placed and this is connected by a joint with second longer five or six ft hollow bamboo pipe of a similar diameter wrapped with coarse cloth rubbed with black earth to make it air-tight and the other end of the larger pipe is fixed into a small earthen pot receiver, (sometimes copper or iron pots called "ghada" are also used) immersed upto its neck in water. When the distillation is complete, the receiver (ghada) gives a peculiar sound by which the watchman understands that he should remove the receiver (ghada) to cool the pot and skim off the oil. About 10 to 14 gallons of water and about 175 to 200 pullas of grass weighing about 35 to 40 seers are put into the big pot over the fire. The oil is carried along with steam by distillation process into the small receiver. The steam acts merely as a vehicle for carrying over the oil in the liquid state in minute globules. Rusa oil has a higher boiling point than 110°C but the theory of the steam distillation of oil differs from the crude one.

The oil becomes black if the water is found insufficient in the Deg over the fire and it loses its commercial value. A little soda (about a pound) is put into each pot each time with a view to preserve the clear colour of the oil.

### Collection.

The oil is generally collected and exported in Kerosine oil tins or in the large narrow-mouthed vessels specially prepared for this purpose. Each pot contains about 15 to 20 gallons. Bombay is the principal market for this oil. The oil from the ghada (after cooling) is skimmed off by a spoon slowly into tins. One still (Bhatti) yields about 20 to 35 tolas of oil each time. On an ordinary working day, one man put on job work, works the Deg upto five times, from early morning to say about 9 p.m. The men are always changed for day and night.

### Grass

The grass is perennial and is common throughout Berar in patches or isolated places. It is called Rusa or Tikadi, Roshel. Suras, Sugandha in Sanskrit and scientifically "*Andropogon Schoenanthus* Linu" or possibly more correctly "*Cymbopogon Mareine* Stapf". In Chota Nagpur, they are called "Marudi," "Santal" grasses and in Berar it is called 'Motya and Sofya'. This is a tall sweet scented grass 6 to 8 feet high with glabrous, straw coloured leafy stems with flat leaves 6-12 "by  $\frac{1}{2}$ -1" with a rounded or subcordate base. It grows near water courses, also in wet marshy ground in the plains and at low elevations. When these grasses begin to mature, they produce flowers, with seed in a very raw state, which are called 'Tura' or 'Longar' in Vernacular. Motya grass is a little smaller in height than Sofya. The flowers contain the highly scented oil. The inflorescence about  $1\frac{1}{2}$  feet are cut off with portions of stalks from the grasstufts when about to flower and bound into small bundles called 'pullas.' One pulla weighs about 25 to 35 tolas. The gullas are generally stacked early with a view that the seed therein should not ripe fully, if riped fully it does not yield oil properly. The yield from the fresh grass is about 3 or 4 per cent more than the stale one in the stacks.

### *Species of economic grasses*

There are some 40 species widely dispersed in the tropics. There are four essential oils recognised by trade. These are (1) Palmarosa (Rusa) (2) Citronella (3) Lemon grass and (4) Ginger grass.

In warmer tracts of India, there are six varieties of the species as noted in the Flora of British India,

(1) General Martin collected the plants in Ballaghat, in 1791-92 and cultivated them at Lucknow and this variety is found nearly throughout the whole of India

(2) Herbert d'Arce found another variety in 1653, while traveling along the Coromandel Coast and found that Golconda people were preparing a perfume from it

(3) South Indian plant A specimen was sent from the Nilgiri Hills with oil in 1902 to the Reporter on Economic products

### *Distinction between Motya and Sofya.*

Motya grass gets white flowers which when young have a bluish colour while Sofya gets bluish flowers which when old are of a red colour These are two distinct plants Definite knowledge regarding the individual properties of the plants may lead to more systematic efforts for their extended production It is essential to recognize four distinct oils with varying properties

The Government are at present making an attempt to convert Sofya oil into Motya one, at Dehra Dun

### *Season for cutting the grasses*

The cutting of grasses begins from the end of September and lasts for about five months, that is upto the end of February. The first cut grass will keep the plant working for four fifth of the season and the second cut for the remaining period It is called "Thut" It means the second flowering of plants which have already been cut once

### *Oils*

There are two kinds of oils, viz, Motya and Sofya The former is much more useful for scents and other perfumes and for medicinal purposes than the latter Motya oil is of white colour and thinner, while the Sofya is of reddish yellow and rather thicker than the Motya The first oil fetches more price than the 2nd sort

### *Where are the grasses available?*

They are available in the following tracts —

Morshi, Warud and Amraoti Forest range

Pusad, Kela-pur, Yeotmal, Taluqs

Buldana Forest Division

Akola do. do.

Betul do. do.

Nimar do. do.

Melghat can be divided into two portions, (a) Open Forest— from which about 90 per cent Motya oil comes, while (b) Dense Forest—from which about 10 per cent Sofya oil comes

It is found also in the following tracts —

(1) Central Provinces, (2) Bombay, (3) Madras, (3) Bengal, (5) United Provinces, (6) The Punjab, (7) Malabar, Cochin, (8) Ceylon, (9) Singapore, &c

*Government Revenue.*

The Government obtains the following revenue —

The Melghat Forest Division has realized the following amounts on account of sale of Rusa grass —

				Annually
				Rs
1894-95 to 1896-97	..			300
1897-98 to 1898-99	..	..		1700
1899-1900 to 1900-1902	.			4600
1905-6	..			4165
1906-7	.	.	...	6780
1907-8	..	...	.	4095
1908-9	.	..	..	6100
1909-10	..	...	.	6500
1910-11	.	.	.	7300
1911-12	}	..	..	11000
1912-13				

*Average for*

	Rs.	Period.
Nimar Dist	2167	1902-3 to 1911-12
Buldana ,,	198½	1901-2 to 1910-11
Amraoti ,,	276	1902-3 to 1912-13
Yeotmal ,,	232	5 years' average—
	Rs.	
Akola Dist.	146	3 years average.
Betul ,,	5202	1902-3 to 1911-12.
	10,650	1911-12
	14,721	1912-13

It is believed that Indian Rusa-Oil is redistilled in Paris and in Turkey to render it more suitable for mixture with "Rose Attar" without betraying its odour.



Some wealthy traders send the oil to Bombay, from where it is exported to Europe direct. Formerly it was exported to Europe through Cairo and Constantinople. So it has got the name of "Turkish Geranium Oil". The estimated export of the oil amounts to something like 60,000 lb. annually. The chief supplier is the Ellichpur market. Now-a-days Southern India has commenced to manufacture and supply it to Bombay in large quantities.

### *Prices*

The oils fetched the following prices in the Bombay market

#### *Per seer of Motya oil*

1906	1907	1908	1909	1910	1911
	Rs	Rs	Rs.	Rs	Rs
„	7-4	5-12	7-8	10-15	11-8
		to	to	to	to
		7	10	12	13-4

#### *Per seer of Sofya oil.*

1906	1907	1908	1909	1910	1911	1912
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs
4-8	3-8	3-8	3-12	5-12	5-8	
to	to	to	to		to	
5-13	4-10	4-4	6-6		5-12	
1913.						

Motya	Amraoti Division	Akola Division.
	Rs.	Rs.
	10 to 12	14
Sofya	4 to 5	

### *Cost of grasses.*

The grass cost only Re. 1 some 10 years ago per cart-load of about 1000 pullas, but now the same quantity costs about Rs. 8 per cart-load.

### *Cost of fuel.*

The fuel is brought to the stills in small local carts. One cart used to cost 0-8-0 a few years ago, but its cost has almost doubled. Each still requires about one ton fuel or 5 hill carts. The fuel and grass are allowed to be removed free of royalty.

This grass is not used as fodder but when young, cattle like it. It is not used for thatching as there is a superstition that Rusa grass thatch upsets the digestion of the inmates of the house.

It has got several medicinal properties It is used for gout, Rheumatic pain &c.

The Forest Department had last year made an experiment in the Melghat Taluq to Extract Rusa oil by steam power It was, it is said, found to be possible The use of steam power will be inconvenient to the ordinary illiterate men who do it usually by the old crude method. The educated men must take lead in the matter. The illiterate people will gradually learn how to handle the machinery and the educated people can start a profitable industry with their help.

#### *Improvement.*

There is room for improvement in the present method of working. The steam and inflorescence are placed into the pot with water and thus increase cost of fuel. The improvement can be effected by inserting a sieve plate between water and grass inside the Deg at a lower level of 4" to 6" as may be found suitable so that some saving will be made in the cost of fuel.

Though a minor forest product, it forms the basis of many high class perfumes and is also an old industry requiring improvement.

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# Paper Manufacture.

By AHMED HASSAN Esqr. Paper Maker, Upper India Couper  
Paper Mills, Lucknow.

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I am not going to waste your valuable time by preaching you useless and stale sermons on the technicalities of paper making or the wonders of machinery, but I am going to tell you in a few words what chances there are for the expansion of the paper industry in India.

The subject which I have chosen is the outcome of my 23 years' experience of practical paper making. I need hardly remind you that the paper industry is a most interesting one—interesting because paper has contributed more to the advancement of the human race than any other material employed in the Arts. Paper is a gift to us from the ancients: it is one of the oldest of manufactures in existence and its evolution has been remarkable. Man first learnt to convey his thoughts by means of symbols on stones and bricks

Just think for a moment how heavy a document, or a letter, was in those early days. What would have been our state if we were still in the brick age as regards writing material and a document was thrown at our heads by an angry disputant? The ancients in course of time found their documents and "books" cumbersome and some one thought of a substitute—and leaves and the waxed surfaces of wood were used. In some parts of India to this day, writing on leaves is practised. But I shall refer to that later.

The next stage was reached when the Egyptians used their ingenuity and skill in the manufacture of papyrus by unrolling and flattening out the thin layers forming the stem of the papyrus reed (*Cyperus papyrus*). In ancient times this reed was widely cultivated in the Delta of Egypt where it was used for various purposes. The plant is now extinct in Lower Egypt but is found in the Upper Nile regions and in Abyssinia. The widespread use throughout the world of the writing material manufactured from the papyrus is well-known, for besides the literary papyrus to be found in the museums of Europe, some are still discovered in the tombs in

**Egypt.** Papyrus was cultivated by the Arabs in Egypt in the 8th and 9th century when paper came to be prepared.

The use of the skins of animals, marks the third stage, for man had discovered that not in all cases did papyrus survive the ravages of time—he wanted something that would last—would carry his fame to generations yet unborn. These skins were used in the form of vellum, or parchment. Skins of certain animals were prepared after methods not known to us. At first, it may be presumed, the method was imperfect. In fact, skins had been tried before papyrus, but given up because the ancients had not sufficiently learnt the art of “curing” or tanning, but later was discovered a way to dress skins to render them capable of receiving writing on *both sides*—that was the improvement over the older writings, which were only on one side of the skins. The skins of sheep, goats and calves were used.

But, here again man was not satisfied. He was in search of a marketable article. Vellum was costly, and of limited production, and it occurred to, some say, a Chinaman, in the year 105 A. D. that it would be possible to produce a writing surface from vegetable fibres beaten to a pulp and made into sheets. This early production, it is said, was made from bark, tow and old nets. and thus paper took the place of stones, bricks, rough skins, papyrus, and vellum or parchment.

### Old methods of Paper making.

I have briefly described to you the kind of material the ancients used to write upon before the existence of paper. Man is never satisfied with his hand-work, and this tendency leads to improvement. You will notice from what I have already told you, that after men found a medium for writing down their thoughts, the commercial value of the material employed came uppermost in their minds.

When the Chinaman first found out how to make paper, he set about it in a crude way and the paper required much improvement. Of course, in those early days, paper was made entirely by hand. The method of manufacture was practically the same, in the main, as that in use in the present day, only machinery now takes the place of hand labour. The individual fibres were separated, cleaned, boiled, beaten into pulp, the pulp subjected to pressure and turned into sheets. And these were hung up to dry, and then sized with animal size.

The Arabs improved on the Chinaman's paper. For a long time, it was difficult to discover from what materials the Arab paper was made. It is now known that the Arabs resorted to flax, afterwards using rags. In Europe, the manufacture of paper was first established by the Arabs in Spain and from Spain it went to Italy, France and Germany. In England, the first Paper Mill was erected in the 16th century. But even now the machinery was of a poor type, and could scarcely be called paper-making machinery, in fact it was not till 1798 that Louis Robert, of France, invented the paper machine. This machine by Robert is the parent of the up-to-date ones we now find in Paper Mills—constantly improved, and now brought to perfection, embracing a multitude of most ingenious and delicate operations producing in a few minutes and by one continuous process from the prepared pulp, endless sheets of paper ready for use.

I have mentioned above that leaves, as substitutes for paper, were still being used in India. In classic India, the birch bark (Bhujpattra) was and is still used for the purposes of paper. By some of the hill tribes, the bark is regarded as more durable than paper and it was on this material that the ancient Sanskrit MSS were written. In Southern India palm leaves have been and are still employed. While being written upon, the leaf is held in the left hand and the writing is scratched on the surface with a sharp tool.

When bark and leaves gave place to paper, it is not known, but the manufacture of paper in India is no new industry. India had its paper centuries ago. It was introduced into the country by the Mahomedan conquerors who had learnt the art from the Chinese. Some writers think that paper was introduced into India from Kashmir in the time of Akbar. Lawrence, in his "Valley of Kashmir," says that Kashmir was once famous for its paper which was in much request in India. It was made from rags and hemp and sized with rice-water; and he further adds that Kashmir obtained the knowledge of paper making from Samarkand—the same place from which the Arabs carried the art to Spain.

In 1774, Ironside described the method of paper-making of his day. The material was old ropes, clothes, nets made from hemp. These hemp rags were cut into small pieces, macerated in water for a few days, washed in the river in a basket and thrown into a jar of water fixed in the ground.

The water was first prepared with *sedji-muttr* and quicklime. After the lapse of a week, the rags underwent further washing and then broken into fibres and put out in the sun, after which they were immersed in a fresh luvium as before. When they were treated three times in this manner, they were fit for brown paper, after seven or eight operations, they were fit for making paper of a tolerable

Almost the same methods are even to this day adopted in making paper in many places in India, for instance in Kaira, Allahabad, Agra, Muttra, Jaunpore, Kanauj, Jeypore, Hyderabad and in almost every province in British India and the Native States. The paper industry, in the hands of old Indian paper makers, had to face steam power and was unable to stand the competition. The majority of the old establishments had to close down and those which survived and which once extensively used rags, jute, hemp and moonj, etc., and employed hundreds of workmen now had to resort to waste paper only, and that, too, on a very limited scale. The paper industry in India has so lamentably deteriorated that it is merely a tottering monument of a once flourishing business in India.

Recognising the strength and durability of our Indian hand-made paper, our mahajans, traders and other businessmen still adhere to its use. Its supply being very limited, the Lucknow Paper Mills have come forward to their aid and turn a kind of paper called "White Rough" which the paper dealers in Muttra, Sindh and other places, first starch with rice and wheat water called "Conjee" and then hang up to dry and after giving it hand glazing sell it as a good substitute for Indian handmade paper.

### Advent of Machinery

The very motive for the introduction of machinery is the desire to reduce the expense of labour. When paper was made by hand to any large extent, that is, for export, a number of workmen were employed, in the separation of the fibres, the cleaning of the separated fibres, the boiling, the beating into pulp, the pressing into sheets, drying of the sheets and so on. Machinery has done away with all this manual labour, only a few men and children being employed to "turn the handle" of the machine. Beyond this, machinery performs tasks which human labour could never have done, and it works with greater accuracy both as regards time and place.

And yet one point more—machine made goods are cheap. Paper, in the old days, could be purchased by only a few; now even the poor can afford to buy it.

### Liberal Supply of Raw Material.

To make paper in bulk—to make it in sufficient quantity to be marketable, it is necessary to have a good supply of the material from which it is produced. Well, we have not to go very far to look for such material. We have lots of it—close at hand—fairly cheap. As you all know, paper is a thin tissue composed of vegetable fibres. These fibrous articles, I need not remind you, are indigenous. We have plenty of rags, hemp, jute etc., and our forests supply us with plenty of grass. The paper manufacturer wants an article out of whose composition are eliminated all glutinous, resinous, siliceous and other foreign matter. Rags, jute, hemp, etc. having already undergone a process of manufacture are free of these. Of course rags are dirty, only and, in many cases contain colouring matter, but these are easily got rid of under a low pressure of steam with a weak alkaline solution, on the other hand wood and grass contain all the intercellular matter in its original form, and this requires a strong chemical treatment. But the fibre or cellulose is strong and therefore stands the test, and as woods, grass and other fibres are plentiful, these are being extensively used for paper making. In fact in India there is a supply sufficient to keep 1,000 mills going. Here are a few fibres—but first of all I shall mention those of no commercial value. Plantain, kans, hathi-chinghar, sugar-cane stalk, Indian corn, elephant dung, saw dust, etc. All these have been tried, but failed to come up to expectations. Raw fibre may be divided into four classes

1. That which is easily reduced and easily bleached.
2. That which is difficult to bleach.
3. That which is difficult to reduce but easily bleached.
4. That wherein perfect bleaching affects the integrity of the fibre

The longer the fibres and the more intricate the mixture of them when wet, the stronger will be the paper. Short fibres, as in the case of kans grass, will be weak when made into paper, as the pressure which single fibres exert under the influence of machines on each other will be weak,

I give a list of fibres which have been experimented with. They are more or less good fibres but some of them fail in one or two essentials to make them of any value.

(1) *Paddy Straw* —A good fibre but owing to the stalks being short and knotty, it cannot be utilised for making good clean paper.

(2) *Ulla grass*—The local Government's experts attach much importance to this, but in my opinion Ulla can never prove a success commercially, for the paper made from it though strong and tough, is only of the brown and other inferior qualities. The Ulla contains many knots and possesses a hard outer covering which cannot be bleached and is therefore unsuitable for white paper, besides the proportion of pith in its composition is so great that very little useful fibre is left after boiling and washing. In short, in my opinion, Ulla cannot be profitably worked, and I don't think Government are justified in making expensive experiments with it. Mills know the exact value of Ulla

(3) *Moonj* —This gives a good fibre and, in fact, for many years, Indian Mills were quite satisfied with it, but moonj soon became popular with mat makers and ropemakers and in consequence although the grass grows wild and there is a large supply of it available, prices have gone up

(4) *Baib* —We have now come to the grass which, not only in my opinion, but of paper makers in general, yields good results. It is a perennial grass, plentiful in the drier tracts of India, from Chota Nagpur and Rajmahal to Nepal and Gharwal, also throughout the plains northwards—the Central Provinces, Central India, Rajputana. The cost of collecting and despatch is not great and therefore it will compete favourably with wood

The Lucknow Paper Mills were the first in the field to discover and recognise the sterling commercial value of the Baib grass, which grass has ever since been universally recognised and adopted by the other Indian Paper Mills. In my opinion, Baib grass is such a valuable material for paper making that the future expansion of the Indian paper industry depends upon it a good deal.

(5) *Rags, Jute, Hemp, etc.*—are universally recognised the best fibres and India being their home they require not much commendation.



(6) *Waste Paper*—There is always a very heavy stock of this useful material in the country and is very helpful along with other raw materials. In fact it is very much desired and appreciated in certain qualities of paper.

### Chemicals.

Having got the material from which to make paper, we are not yet out of the woods. There are other essentials—important essentials too, without which we should return to the days of the paper made by the ancients. To produce paper of the quality we use to-day, we must have chemicals, and it is a lack of some of these that has made paper more expensive to manufacture in India than it would be otherwise. Almost all the chemicals can be produced in India; and what an opening up of trade this will mean; but first of all, more mills will have to start working to induce chemists, those of them who are capitalists, to venture into these fields. And why should more mills not be erected? There is money in the business—it is a safe investment. For Heaven's sake don't wait to get Government help. We must do this ourselves.

The chemicals I refer to are Alum, Caustic Soda, Bleach, Soda Ash, Lime, Rosin.

(1) *Alum* —There are in existence a few Alum factories in India, but they turn out only small quantities not sufficient to supply the paper trade, besides they are lacking in the quality desired by paper makers, and yet why should they not be able to produce more alum of an improved quality and earn more money? Possibly the inducements to them as yet are not sufficiently great.

(2) *Caustic Soda* —An important chemical for which, however, a substitute can easily be found in India. In fact Sedji Mutti and Lime once used to be tried here with great success, and could be tried again with better results.

(3) *Bleach or Chloride of Lime* :—Without this chemical it is impossible to make white paper, therefore its importance can well be imagined. Were there no Paper Mills in India, the chemical would still be in great demand, for Cotton Mills are extensive purchasers, and if my countrymen could only surmount the difficulties in the way of manufacturing bleach, there would be a big fortune in store for them. It will, however, require men of great patience—men who will not easily give up at first failures. The manufacture of Bleach requires a certain temperature and therefore a factory for

ts production must be situated at a place not warmer than 55° to 60°, for heat is deterrent to chlorine. A few pounds of it can be made anywhere, but to produce it on an extensive scale, it must be made in a cool climate. A refrigerator might do but will be very expensive.

*Gelatine* —In connection with Bleach, it will not be out of place to refer to Gelatine, a nitrogenous substance found in animals chiefly in their connective tissues. For "sizing" purposes Gelatine is excellent. Some 20 years ago an attempt was made to manufacture it in Lucknow. The process is a simple one, but the difficulty arises in the freezing. Gelatine, to be good, should be "set" like a jelly and that is possible in cold climates only.

*Soda Ash* —There are already some firms in the country, like Messrs Begg Sutherland & Co of Cawnpore and Agra who manufacture this important chemical. In cases of emergency one can easily depend on Soda ash but as is the case with other local manufactures, it is not free from impurities and requires improvement.

*Lime* —Lime is very extensively used by Paper Mills. It is well known to you that the Indian supply is quite inexhaustible.

*Rosin*.—For a long time we used to import rosin from Europe. Now for the last year or two we utilise country Rosin produced by the Government Turpentine Factories. If a little more attention were paid to the manner of its production, the article would in no way be inferior to the imported Rosin.

### Important Clays.

The paper maker has got his wood and his grass, rags and jute etc., he has his chemicals and now he wants clays. Yes, clay is used for loading, for finishing and for closing the pores of paper. Not every sort of clay will do. It must be soft, clean and tenacious. This last quality is the most important. The clay must adhere to the fibres. Paper makers at present import their clay from Europe, yet in India—in Central India for instance—good, serviceable clay can be had, and in different colours and quality. No doubt the clay is not to be had in every respect as good as that imported, but quite capable of being utilised with profit. Then the coloured clays—khaki, blue, yellow, brown, red &c, will, if used, bring about a saving in dyes.

Every trade has its own ways and formulas of working and these are very jealously guarded all over the world. In fact Euro-

pean Mills will not allow an outsider to enter their premises. Considering I am still in the the service of the Lucknow Paper Mills, I can be rightly accused of disloyalty to my firm or of unprofessional conduct, if I explain to you fully the ways and formulas and also how chemicals and raw-materials are worked with the best results by the Lucknow Paper Mills, the best equipped, best managed and best paying concern in the whole of the Indian Empire. My object in writing this paper is to show you how it is possible to expand and develop the paper industry in India; therefore, I have described only the methods, which are the common property of every Paper Mill.

### Sound Commercial Adventure

There is money in paper making, and no chance of failure, provided the business is conducted on sound, healthy lines, the promoters are good business men, and the management in the hands of experienced workmen. It must not be forgotten that money makes money, therefore where improvements are necessary, make them, let the cost be what it may, for the money spent will return again and more. A duty on foreign made paper is a good thing, provided the country's demands can be supplied locally. But can the few existing Paper Mills do this? I certainly do not think so. On the other hand, few people would demand the levy of such duty, if we could produce as good paper as foreign makes, and sell it cheaper. Why should this not be possible? The War has opened the eyes of Indians to rely on their own resources. You may have noticed the efforts the Industrial Department of the Local Government has been making to induce people to take up seriously researches in vegetable and natural dyes. A little exertion and attention on the part of our people would permanently relieve our country of the necessity of importing dyes, chemicals, etc. And then, with all the necessary ingredients at our door, we can go ahead and supply India with all her wants; and not only India, but foreign countries also for we have what many of them have not and are not likely to grow, and that is the material for the making of paper.

### Conclusion.

The art of paper making is one of the most useful that has been invented. Paper has contributed, as I have already said, more to the advancement of the human race than any other material used by

thousands of men, women and children. Paper has become an item of prime necessity. In every walk of life, it is used—we cannot do without it. Would education be what it is to-day if we had no paper? But I need not dilate on this subject—it is patent to all of you here that without a medium on which to properly convey thoughts to others, education would not be so widespread as now. In short, paper has acquired a degree of importance, with which it would not have been credited by the Chinaman who invented it. This is certainly recognised in Europe. Why not here? It strikes me as strange that my countrymen do not come forward to invest money in this paying business. Do not wait for the assistance of Government. Are we not sure of ourselves—of the men we put in the management? A judicious search will soon find the men required. Yes, let us develop this business, and in developing it, believe me, you will be working to that end for which all patriots are striving, of making the country more self-contained in the production of all articles required for civilised life. Briefly, I have accurately focused all the existing facts, does the scheme then seem not a sound one? If we have failed before in adventures that seemed rosy, it was because of mismanagement. Let us employ practical men and no favourites and success is assured.

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## Paper Industry.

By H. B. Singh, Esqr, Upper India Couper Paper Mills, Lucknow

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It is needless to say what important and prominent part paper has played since its introduction in its finely finished form into the world. It is through paper that religion, philosophy, literature and science have made fast and vast strides and transformed nations from the rudest hordes into glorious specimens of mankind we see today. Modern progress is also due to the lifetime labour, devotion and self-sacrifice of men of eminence in each subject, for which they had and have developed a peculiar taste with the sole object of educating their respective nationalities upto the standard of perfection. Had there been no paper and the practice of handing down knowledge by written words from man to man the vast knowledge, the profound wisdom, the deep wit stored in the pages called books containing the history of the remotest period, extending back to thousands of years, as well as the history of every-day events, serving as real and practical guides to the younger and more impulsive generations, would have been lost for ever. In view of the supreme utility of paper, it behoves us to find out all possible means to develop its manufacture, and to try our utmost to remove all obstacles in its path to make it cheap and accessible to the rich and the poor alike.

The demand for paper is ever on the increase so much so that even the grocer uses paper for small packets in his daily retail business, thus substituting paper for leaves and other packing material. Its increased demand is also proved by the fact that in times past, only the hand-made paper was used, while in modern times the Indian machine made paper, manufactured in quantities larger than the hand-made ones is consumed. In addition to this supply, the foreign made papers too are imported into India in enormous quantities and find ready market through their being cheaper in rate, though not strong and durable like the Indian made papers. Their cheapness which enables them to compete so easily with Indian Mill papers depends on the following causes —

- a The main accessories required by Paper Mills, such as chemicals, Colours, Dyes, Machinery, Felt,

Beltings &c. are made in Europe and obtained there, fresh and of the required strength leading to economy, at a moment's notice, at a very cheap price, together with upto date information ready to hand, owing to there being a large number of Research Institutes and manufacturers who have ample time to make necessary arrangements for the supply of requisite articles at the proper time.

- b Freight on all imported articles from Europe is much higher than that on European paper which sells here without any difficulty
- c. Introduction of upto date machinery dispensing with a large number of labourers and thereby cheapening the cost of production

To meet the demands for paper at a relatively cheap rate in the face of foreign competition, we should adopt the following measures —

1. Big factories should be established to turn out machines, Boilers, Fly Wheels, Felts and other accessories, now imported from Europe. Great has been our difficulty in obtaining say, a new fly wheel or a boiler in place of one which gets out of order through some accident, resulting in the stoppage of the work and involving heavy loss, till the arrival of the new articles from a far-off land. There are mines of iron ore which can be explored for making the articles now bought from foreign countries

That India is a land of roots, herbs and drugs—none would deny. If attention be devoted to the indigenous raw materials, any quantity of invaluable and useful cheap colours and dyes can be made in India. For instance, metanil yellow and other kindred dyes so largely consumed in the manufacture of paper and now obtained at famine prices, seem to be nothing but scientifically refined products from Haldi (turmeric) and other allied roots. This is also the case with felts and beltings which can be easily woven from wool and cotton ready to hand. Similarly every kind of chemical of the required strength or its effective substitutes, suited to climatic conditions, can be produced with ease and profit by establishing Research Institutes to produce chemicals on a commercial scale.

2. Coal which is an essential article for fuel deserves every attention. It is found in abundance in Bengal and can be cheaply obtained by the factories there, while mills situated at a great distance from such mines have to work at a great disadvantage on account of high rate of Railway freight which almost swallows up the profit and increase the cost of production. It is therefore, imperative for mining experts to survey and explore possible coal fields in the United Provinces, the Punjab and other provinces yet untouched, because such discovery would go a great way towards minimising difficulty so sadly experienced.

3. Since Railway freight is intimately connected with the cost of production, special concession rates of freight on articles largely consumed by them, should always be fixed for different Industries, Factories and Mills without any favour or distinction and the free time hitherto allowed for unloading and shunting back empties to the station should be extended

Next in importance comes the customs and Octroi duties, which in India operate detrimentally to trade and commerce. The most feasible way to stop foreign competition is to impose heavy customs duties on all foreign articles meant for Indian markets, and freightage on foreign paper and chemicals should be equalised or the utmost minimum rate of customs duties should be fixed on imported paper materials to reduce the cost of making paper, to enable the Indian made paper to face the competition without any anxiety.

The most vexatious tax in India is the octroi duty on paper. This duty is a tax on education and hinders its spread. This should be absolutely abolished to cheapen the publication of books which is at present too costly to be availed of by many a poor student so keen on taking full advantage but so piteously deprived of the blessings of education through Newspapers, Photographs and other educative and edifying illustrated pamphlets and periodicals

4. Government are the largest consumers of papers. Without their patronage no paper mills or factories &c. can work. Their whole requirements should be drawn from the Indian made papers which may be purchased in equal proportion from all the mills, or the proportions should be distributed provincially, the rates to be fixed in accordance with the substance, finish and durability as well as the amount of expenditure incurred in the paper making materials.

5. In addition to the above facts contributing to the cheap manufacture of papers, a combine among all the Indian paper mills is absolutely necessary to stop unhealthy competition leading to the most ruinous consequences

6. There should be a number of technical schools to teach subjects bearing on paper-making, as well as schools for educating labouring classes.

In conclusion, every form of concession should be made to cheapen the manufacture of paper to stimulate the spread of knowledge to the very village hut, and last but not least to make India self-supporting and independent.

I hope that all the circumstances specified above, along with other important matters in connection with the paper trade such as Baib and Wood Pulp Manufacture now carried on at Lucknow, to give only one instance, will receive every attention at the hands of the Hon'ble members of the Indian Industrial Commission.

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## Plantain Fibre Industry.

By J. N. Bannerjee Esqr. Late Manager Longley Philip Fibre Factory  
Madhupur ( 9 Kessey Mitter Ghat Street Bagh Bazar Calcutta )

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The discovery that plantain fibre is a valuable substitute for cotton as material for cloth and can also be used for the manufacture of paper and cordage is one that ought to effect a revolution in the condition of the peasantry in almost all parts of India, where, if the requisite water supply is obtainable, plantain can almost always be cultivated with profit, its fruits being a chief article of food for nearly all classes of the population and the core also being largely consumed. There are large forests of plantain in several parts of India and the discovery of the use that can be made of the fibre ought to increase immensely the value of the plant.

Various proceses, both mechanical and chemical, have been devised for extracting the fibre. The district of Ohingleput has taken the lead in the matter of making the industry a source of profit to the ryot and has been quickly followed by the Tanjore Agricultural Association. It now remains for the other similar Associations throughout India to follow the example set, for there is hardly any other industry, with boundless possibilities of development, which is more convinient for the agriculturist. At the Melrosapuram Agricultural School plantain fibre is being made into ropes. These ropes are 25 per cent higher than hemp ropes in price. For all practical purposes plantain fibre ropes are about as good as hemp ropes especially in damp or moist climate, and being white and glossy, have a very attractive appearance. When these facts are more generally known, people will not hesitate to buy ropes made from plantain fibre. There is an extensive market for ropes in India, and when the supply is large and continuous, there will no doubt be an extensive demand for the said fibre throughout the world.

In the preliminary stage of its experiments, a crude and complicated machine for extracting the fibre was introduced by Mr Proudlock, the Curator of Nilgiri ( Ootacamund ), the pioneer of the industry in Southern India. It consists of a smooth piece of wood 6' x 4" x 4" on two posts attached to the ground and a blunt knife

fixed to it lengthwise with its edge downwards. One end of a string is attached to the handle of the knife and the other to a long piece of bamboo to form a lever which is worked by the application of pressure by the left foot, while the workman stands facing the machine. The fibre is extracted by inserting long pieces of plantain sheath or leaf stalks less than 2" in breadth between the wood and the blunt knife and pulling them with some dexterity, while the blunt knife is raised and dropped by the pressure put on the lever by the left foot.

The great drawback of the machine is that it is not portable and the fibre extracted is too small in comparison with the labour that it involves.

It is said that Babu Manindra Nath Banerjee of Calcutta, has discovered a chemical process. By this means, the fibre extraction is more inexpensive and easy, but I am doubtful if the said fibre will be equal in strength to that extracted by the machine. However it goes without saying that the process deserves a systematic trial for its success.

The plantain fibres which were exhibited at the Cachar Industrial and Agricultural Exhibition by Babu Man Gobinda Chawdhury Joint Secretary to the exhibition elicited the admiration of the visitors. The method employed was very crude for the sheaths were first passed through a sugarcane mill with smooth rollers, and then combed on both sides with an iron comb which brought out most of the cellular substance. The blunt edge of sickle was afterwards used to get more of the cellular substance out. The bundles of fibre were washed in plain water and afterwards boiled with alkali and soap then again washed in plain water and dried in the shade, but after a few days the color of the fibre became black as usual.

Several years' experiments show that no other process of cleaning the fibre is superior to the use of a machine for cleaning, which only requires washing in plain water to take away the sugar of the same.

After various researches and experiments, recently an improved extractor has been introduced in the market by the writer himself, the principle and method of working of which are quite simple and easy. The fibre extracted by this machine has been awarded high class certificates at several exhibitions and it is working in several industrial experimental farms such as Baroda, Mysore

Travancore and Cochin Estates &c The special features of this machine are that the fibre extracted by it, is uniform in quality, the amount of breakage in fibre is much less and no great effort is required to work it It can be driven by steam or any other power and a few minutes practice will render the extraction of the fibre very easy It is possible to extract one pound of clean marketable fibre per hour for one man It can be worked for many hours without fatigue as the sheath is to be scratched by revolving a wheel with the right hand and by pressing a blunt knife by a lever handle with the left hand The cost of the machine is only Rs 50 complete for handpower It is in weight 60 lbs, (hence portable) made of iron, (hence durable) and may be repaired locally, if necessary, after working it for some years, it occupies a space of 3' x 3 only It is not only suitable for extracting fibre from plantain sheath but from aloe and other fibrous leaves Each machine is fully equipped with direction paper, by which any one can work it without any difficulty

Now, I shall deal with the profit realisable from simply extracting the fibre It can be sold for making several articles required for domestic and agricultural purposes, including ropes of all sorts as well as clothes, turbans etc In America it is sold at £30 to £35 a ton A fully developed plantain stem will yield about 2 lbs. of clean fibre An adult with a week's experience can extract fibre from about 8 stems a day, a boy being given to assist him in tearing the sheaths lengthwise and in collecting the broken fibre and drying it then and there for dressing The adult's wages being put down at 6 annas and the boys 2 as a day, they will produce 16 lbs. of fibre per day The cost of extracting one ton of fibre from plantain stems as they are cut for fruits instead of being thrown away to rot as is done hitherto, amounts to Rs 32 a ton, to this add Rs 50 for shipping, trader's commission, insurance, bailing, cartage, railway freight and other sundry charges Hence the total cost comes to Rs 84 Taking the lowest price of the present American market viz £30 per ton or  $£30 \times 15 = \text{Rs } 450$  less Rs 82 or Rs 368 would be the nett profit.

The plantain trees raised on an acre of land will yield about a ton of fibre and the enterprise may be undertaken upon any scale according to convenience, though for commercial purposes it is best to carry on the industry on a large scale I do not wish to mention here the extra profit by the sale of the fruit, leaves and cores, as my

aim is to show the profit from the fibre alone that may be extracted from the stems now thrown away to rot. The fibre manufacturer may purchase stems from the owners of different plantain gardens at a trifling cost, for these are now almost entirely wasted and bring no profit to the owners, being no longer used for the preparation of alkali for washing purposes, on account of the introduction of cheap soap.

In the foregoing calculations, I have also left out the cost of carrying the plantain stems from different gardens to a central spot, where the extraction is to be made, which would be rather expensive and should be avoided as much as possible by getting the fibre extracted close to the garden where it is available by taking there the portable machine. The owner of a garden who extracts the fibre has not to incur this expenditure nor that of purchasing the stems. Persons of limited means may make a trial after purchasing a sample machine. The work of exportation may be entrusted to any of the numerous agencies in all presidency towns.

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## GLASS MANUFACTURE.

By Rai Sahib Lala Panna Lal, Proprietor Upper India Glass Works, Ambala City

*" A decline in imports keeps money in the Country "*

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A fair amount of information is already before the public in connection with glass-making in India. First attempts have been without exception failures in every province. These failures have damped the spirit of fresh enterprise in an industry, the outturn of which from foreign countries finds its way in the humblest home in some shape or the other. A tiny looking glass, a bottle containing oil, and a phial containing medicine are the articles without which even the poorest man cannot do. Where do these things come from? Can they not be made in India? are the daily questions that find utterance, from the anxious tongue of a patriot. No doubt their manufacture is practicable in India, a small number of factories are already at work to produce bangles, chimneys, and phials, but their outturn is so infinitesimal and so hampered in various ways that they are unable to meet the enormous demand for glassware, that is hourly increasing with the progressive needs of the country. India imported in 1913-14 glassware to the value of Rs 1,89,84,495 after deducting value of exports. All the glass factories in India put together do not produce glassware worth more than 15 lacs. Making deduction of this overestimated amount of 15 lacs from the total value of imports, there is still a vast margin of the home market for a large number of new glass factories to cover. Capitalists with a technical bent of mind can successfully invest their spare money into this industry without the least fear of failures now. I say now advisedly. Time was when, in the last quarter of the eighteenth century, little was known about this industry. Now sources of raw materials are known, a leaven of skilled labour is available in the country, manual labour-saving machineries are in the Western countries awaiting importation, and technical literature is coming out to assist the uninitiated in the process of glass-making. With these facilities within the reach of the prospective glass-manufacturers, and with the established demand of the home market for indigenous glass-ware, I see the future full of hopes and bright prospects. The

spade-work has been done by the pioneer factories, the way has been made smooth for new comers to go ahead, and to adopt the least competitive lines. A word of advice, in this connection, I am sure, will not go unheeded. A habit of copying your neighbour brings an undesirable competition and proves the ruin of perhaps both or of one of them, crippling both in their resources to a certain extent. Be a glass manufacturer by all means, but strike out a new line, that is, if your neighbour makes tumblers, you may take up jars, but if you cannot help taking up the same line, you may try to come to an understanding with him, or failing in that arrangement you may adopt the least offensive course of making your tumblers of a different design or quality. The last procedure will have to be adopted by every manufacturer as the law of patents and registration of trade marks become better understood in the country and as the struggle for existence becomes keener than it is now.

Glass industry has been a secret trade from its commencement. Even now it is impossible for an Indian to get training in a glass factory in Europe or England. Some years ago there was an offer of Government of India Scholarship for learning glass-making abroad. No admission could be secured in England, though the official recommendation and persuasion took considerable pains. The character of the scholarship had to be changed. But that attitude of the foreigners should not be allowed to stand in the way of our making progress in this or any other industry. There is such a thing as self-education in pure and applied science. With a little expense, suitable opportunities and sincere encouragement, it is positively certain that our youngmen, given intelligence and good physique, can equip themselves in this country, quicker than they do abroad, with the necessary knowledge and practical experience in glass-making. The writer of this paper makes this declaration from personal experience he had gained at his Ambala City Glass Works.

### Management.

Good management spells success. A man with practical acquaintance with the various processes employed in a chemical industry like glass-making does not waste time and money of his employer. He sets about his work in the right way, he gathers the necessary raw materials and men according to his needs, and puts them in operation to the best advantage of the industry, which he under-

takes to guide into fruitful channels His previous acquaintance with the industry is a strong link between his employer and success in the undertaking Any reasonable investment in an expert manager pays well in the long run and should not be shirked as is the habit in certain quarters Mr J Sarkar, the author of "Economics of British India" aptly says —

The youngmen sent forth by our colleges have neither the training nor the habits of business assistants and so the head of a firm here has to waste much time and money before he can discover the gifted few among them and give them the requisite practical training

Still more harmful is the scarcity of business capacity of the highest kind Indian firms, even with large capitals, are too personal in their management, the absence or illness of the head manager paralyses work and his death often ruins the whole concern, just as the fall of the general leads to the flight of an Oriental army even at the moment of victory In an English business on the other hand, there is a chain of able officers, and a vacant place is quickly filled by promotion In England, a lad enters a business as an assistant or even lower, as an apprentice He then rises step by step till he becomes the senior partner of the business to whose success he has so long contributed Hence an English firm is carried on from generation to generation in unimpaired efficiency by an unbroken succession of fresh chiefs of tried ability and ripe experience But business owners in India seem to have a genius for driving away their ablest managers who usually set up a rival shop over the way with a colourable imitation of their late master's title and trade mark Senior assistant after senior assistant leaves the business with his heart full of resentment at his further promotion being hopeless and at his being ever treated like a servant and never made a partner Thus, in India experience and skill are divorced from capital, and the efficiency of both is greatly diminished After the rupture, the old business continues under a new and raw manager, and its affairs quickly get into confusion or decline, at the same time the new shop set up by the rebellious expert after a brilliant start withers away for want of the necessary capital In time, no doubt, matters will right themselves A new and more modernised generation of our capitalists will discover how to come to terms with their managers and experts

## Training

The training of apprentices may be taken in hand in this way. An applicant for training for superior service should be a youngman of education with a pronounced taste for applied chemistry. He should possess good physique and be able to stand the high temperatures of a glass-works. He shall have to start as a fireman eventually assisting as an attendant at the furnace, while the latter is in working condition and under repairs. If he is found able to stand this arduous work and to possess a discriminating eye capable of making distinction between various grades of flame, he may be allowed to take up the study and practice of making mixtures of raw materials under the directions of a glass-maker. His book knowledge of raw materials may be assisted and promoted by a free supply of the existent literature on glass-making in the English language. If the apprentice seems to have made appreciable progress in these two departments, he may be permitted to learn potmaking, cutting, grinding, testing outturn, and packing in the order mentioned. The last course of training should end in the sale and purchase departments of a factory, where the apprentice may be encouraged to pick up the commercial system in vogue.

The whole course of training should not take more than eighteen months for an intelligent youngman, at the end of which he should be able to pass the double course of practice and theory, and be granted, if successful, a certificate of Competency over the signatures of the Factory Glass Expert and the Provincial Director of Industries.

Glass factories may not be willing to afford facilities for training in the manner indicated. Their consent may be gained by the Local Governments at the time of sanctioning loans, supply of costly machinery, granting aids, or other substantial concessions.

Training may also be secured by the payment of premiums by apprentices or by interested parties on their behalf.

The services of apprentices, when converted into commercial value to the satisfaction of the factory owner though the whole course be not complete, may be paid for at suitable rates.

Blowers, potmakers, firemen, cutters, grinders, machine-tenders, pressmen, carpenters, moulders and packers require a different training from that mentioned above. All these men are drawn



from the labourer class, having keener intelligence than ordinary labourers

A blower-apprentice starts as an assistant to a blower and helps the latter in making necks of bottles or if chimneys or similar articles are being made the assistant gathers molten glass on the end of a blowing-pipe and shapes it for the blower, who now and then permits him to have a little practice in blowing small cylinders. The apprentice wastes daily some glass in this way. If he be a smart young boy, he manages to pick up the trade with a couple of years' practice.

A workman of absolute clean habits, possessing sinewy arms, intelligence, and good memory is the man to make a good pot-maker. Above all he should be honest, obedient, and truthful. He should not be in the habit of covering up his faults. A man of this type is a sterling asset of the factory owner. Breaking of pots and subsequent wastage of molten glass in the furnace and its attendant chocking up of flues are regrettable accidents due to concealed flaws, which originate in the pot-room. A defective pot, if broken in the pot-room, will only cause the loss of wages and time spent in building it. But if the defect be concealed and the pot allowed to proceed to the furnace, it will cause far greater loss and waste the time of good many workmen. Pot-making is described elsewhere.

A good mould-maker is the soul of a factory. A carpenter who understands drawing and can make moulds true to measurement is in fact a great helper in attracting customers. A glass factory does not train him. Men having foundry practice should be engaged.

Other workmen, though important in their way, do not call for any particular mention. They are easily trained and easily replaced.

### Capital.

A modern glass factory, equipped with a large furnace, an automatic blowing machine and a press, grinding wheels worked by power, sufficient accommodation for mixing, storage of chemicals, godowns for outturn, workmen's quarters, water supply, and office, requires an investment in round figures as under. —

	Rs.
Furnace, including chimney ... .	10,000
Annealing and baking ovens ..	2,500
Building, including a melting hall, godowns, workmen's and menials' quarters, and office but excluding land	20,000
A blowing machine and a press	15,000
Motive power and grinding wheels, with a small shed	3,000
Tools and plants ..	2,000
	<hr/>
Total	52,500
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Construction charges	5,000
Water supply .	3,000
Working capital ..	25,000
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Grand Total	85,500

A smaller furnace, with necessary buildings, dependent upon manual processes, requires about Rs 25,000 for erection, and Rs 10,000 as working capital

These may be considered only rough estimates, and may be exceeded by 40% if the erection were taken in hand in these abnormal times

The initial cost of Ambala Glass Factory, including a furnace, annealing ovens, store rooms, men's quarters, and office, all built with a contemplated expansion of business, amounted to a sum above Rs 80,000 which amount does not include subsequent extensions of more furnaces, men's quarters, machinery and water supply.

But elsewhere glass factories on a modest scale have cost from Rs 20,000 to Rs. 25,000 excluding working capital

The first estimate may be considerably exceeded, if more than one automatic blowing machines are installed or if more costly machines are preferred. The working capital in that case will have to be proportionately increased, and more than one or a larger furnace will have to be built with a larger expenditure, other accommodation increasing with the size of the furnace and machinery.

Few existing banks are willing to finance a glass factory when extensions are contemplated. This reluctance arises out of the ignor-

ance of the present day directors, who are considerably influenced by the failures of certain industries financed by certain banks. The failures were due to management being in the hands of laymen. To facilitate the flow of funds into industrial channels, it is necessary that there should be in each province an industrial bank, guided and controlled by a mixed Board of Directors drawn from the class of approved men of business and experts. The pecuniary qualifications of expert Directors should be lowered so as to attract them to serve as such or they should be appointed as paid Directors for a limited period by way of salary or honorarium. The bank so constituted will be in a position to afford financial aid to deserving industries. When glass making is carried on as a cottage industry, co-operative societies or banks may help them direct or through the proposed Industrial Bank. The latter may, in this way, become the central provincial institution with co-operative societies as branches.

### Co-operation

Glass-making has been carried on from time immemorial as a cottage industry in India. When glass factories on modern lines were erected, workmen were drawn from the old *Munhar* class for training under European blowers. They picked up the work, but never stuck to it. While they could not work at a modern glass furnace in the summer, they did not mind the less heat of the indigenous furnaces, and manufactured with the help of the members of their family, bangles, beads and small phials until the rainy season set in. During this season they turn into hawkers of their manufacture from village to village, selling them in exchange for the produce of the land. This mode of life is innate in their nature and has proved the greatest hindrance in attaching these people to factory life. But this is the only class in India who is by nature born to engage in glass-making. Attempts were and are being made to attract fresh labour from other communities. The process is in an experimental stage, and it is too early to say that the recruits will stick to their newly-acquired trade. Should they fail to secure employment in a glass factory, they, as individuals, cannot put their skill to use at their homes to earn a living, without receiving assistance from their homefolk, who remain untrained and unattached to the industry. This circumstance might divert them to a different mode of life, unless more glass factories spring into existence.

There is one system that might succeed in drawing closely this new class of workers, or the old *Minhar* class, to factory system. It has already answered well. It consists in associating glassmakers and blowers into a group of partners, manufacturing and selling glassware at the premises of a glass factory to the owner thereof, at rates varied from time to time for a number of years. Under this system they seem to work well and put forth their best energies in the matter of meeting the demand of the market in quality and quantity. If this system of co-operation in production were adopted by the existing glass manufacturers in their factories, it is believed the industry will advance by leaps and bounds. It will tend to attach workmen to one factory for at least the term of their agreement, and assure continued work to the factory. The principle of co-operation in production might be extended among the different manufacturers of glassware and lead them to combine into a union of glass manufacturers for protecting their trade interest against the operations of foreigners. Combinations may be regarded as undesirable by votaries of Free Trade, but nascent industries like glass-making cannot be nourished into full growth without protection, and co-operation and combines without Government assistance are the only forms which the manufacturers and the consumers can vouchsafe to the industry.

In this connection, the public is invited to adopt the principle of co-operation in consumption by starting in each town co-operative stores of indigenous articles.

### Other Causes of Failures and their Remedies

Glass-making is regarded by managers downwards as a sweating industry. Skilled labourers, originally drawn from the old *Minhar* class, who still work on their own account, are reluctant to contribute to the alleged immoderate earnings of capitalists. They manifest this reluctance by occasional reversion to their old work. A large number of workmen, particularly of the *Minhar* class, is not disposed to let capitalists have larger profits without having an appreciable share of them by demanding higher wages, which make glass manufacture impracticable in India, and expose the home markets to foreign exploitation and dumping. There appear three feasible remedies to assure for glass-making a sure footing in India.—

- 1 The old *Mukhar* class may be helped to work in their cottages by co-operative societies with loans and by Government experts with technical guidance in the erection of effective furnaces and with the supply of modern tools on payment. They may further be assisted to dispose of their glassware by the provision of sales organisations, consisting of wholesale buyers incorporated into industrial stores. These stores may also stock and sell raw materials and tools to these men.

The Government may further help cottage workers by securing to them special maundage freights for the carriage of coal, sand, soda, fireclay and the outturn of glassware on the Indian railways.

- 2 Factories may engage surplus workmen not absorbed in cottage industries, and train more suitable workmen from other classes in such numbers as may not prove burdensome to them.
- 3 Factories may be assisted by the Local Governments in the supply of labour-saving contrivances, like blowing machines and presses on the hire purchase system on easy terms.

### Site

The ideal site for the location of a glass factory demands

- (1) Normal temperature, cold being preferable
- (2) Proximity to the supply of good coal, sand, and fireclay being highly desirable
- (3) Easy accessibility to means of transport and communication.

But if Railway companies agree to charge special freights, preference may be given to a site in the hills or any other place having a low temperature, but connected by a railway.

### Materials.

The following appliances and raw materials are required in the production of glass and glass-ware.

### Plant and Tools.

#### FURNACES.

Circular furnaces for melting glass are the most economical both as regards the first costs and the quantity of fuel they require.

When wood alone was used as fuel, no others were employed, but since the introduction of coal other forms have been adopted, though circular furnaces are still the most 'numerous. These are easy to construct and free from many complicated parts, but do not develop high temperatures, which a gas furnace does in a particularly regulated manner. The construction of furnaces for the use of gaseous fuel varies in the different glass works. Amongst these furnaces Sieman's regenerative gas furnace is of the greatest importance. Sieman's furnace possesses the following advantages —

- (1) Fuel is saved from 40 to 50 per cent. in quantity
- (2) More than 30 per cent of work is increased owing to the unlimited production of heat, with low chimney draught
- (3) Purity of flame, of great benefit with open pots, diminishes the oxidation and deterioration of the metal heated in the furnace.
- (4) Increased durability of the furnace on account of the absence of ashes and a perfect uniformity of heat throughout the furnace
- (5) Complete command of the intensity of heat and of the chemical nature of the flame, which may be arrested or changed from a reducing to an oxidising flame, or the reverse, at any moment.

The gaseous fuel is obtained by the mutual action of coal, air, and water at a moderate red heat. A brick chamber of certain dimensions has one of its end walls converted into a fire grate, that is about half way down, it is a solid plate or brick work and for the rest of the distance consists of strong horizontal plate bars, where air enters, the whole being at an inclination such as that which the side of a heap of coals would naturally take. Coals are poured through openings above upon this combination of wall and grate, and being fired at under the surface, they burn at the place where air enters, but as the layer of coal is very thick, various operations go on in these parts of the fuel, which cannot burn for want of air. This unignited but intensely heated mass of disintegrating coals produces mixed gases. They rise up, collect into a gas canal and proceed horizontally for any required distance, and then descend to the heat regenerators, through which the gas passes before it enters the furnace. A regenerator is a chamber packed with fire-bricks,

separated so as to allow the free passage of air or gas. There are four chambers placed under a furnace. The gas ascends through one and air through another, and both come out through outlets at one end of the furnace, where, mingling, they burn, producing the heat due to their chemical action. Passing on to the other end of the furnace they pass down through similar outlets into the two other chambers, heating them intensely, as they pass out and up to the chimney.

Considerable experience is required to distinguish between different degrees of temperature needed to manufacture glass of various qualities and colours. A new workman's untrained eye is an unreliable indicator in this respect. A recording Pyrometer is an invaluable instrument for a glass-maker. It costs from £ 20 to £ 30 and will prove of immense service in Indian glass works. It will eliminate guess work and will prolong the life of a furnace and pots by maintaining constant temperature.

Parts of a furnace, which are exposed to the abrasive action of heat and the softening influence of molten glass, are built with highly refractory materials. In this respect a furnace may be divided into two parts. One that comes into contact with heat only, and the other that is in close touch with both the heat and the molten glass. The first part requires a building material that will stand the expanding action of heat and shrinkage when cold. Such a material is provided by a mixture of clay, silica, and lime, in certain proportions, baked into bricks of various sizes and shapes. The other parts of the furnace such as siege, arches, and walls are built of special blocks and slabs, made from the carboniferous clay, atmospherically dried for a number of months.

A newly made furnace is very slowly heated for several days. And when moisture has been driven away in this way, the heat is gradually raised from glowing red to white colour. The temperature is now lowered to receive the pots baked in a separate oven.

### Pots.

Pots, also called crucibles, are made from powdered burnt and unburnt fireclay. These clays are sifted with great care, measured with tubs, thoroughly mixed, and damped with tepid water, adding only so much as is necessary to knead the mass properly. The water must be pure and free from destructive impurities. After

two or three days the damped mass is treaded upon and turned over with a wooden shovel of strong fibre nine or ten times in an interval of 24 hours and this process is daily repeated for about twenty days. Thus the mass is prepared for making of pots. In order to avoid air bubbles, the mass is cut up into uneven shapes. The crucible is formed in a wooden mould of a given size, lashed with iron hoops, on a board powdered with chamotte, with a view to facilitate drying of the bottom. The cut pieces of wet clay are now dashed into the mould and rammed into a bottom with a rising circular ring, gradually raised into the walls of a crucible by the pot-maker (Pots may also be made mechanically, if the requisite presses, etc, be available). When a crucible is thus built up, it is covered, and thereby an all around slow uniform drying is secured. Drying in the cold weather is effected by artificially raising the temperature of the room, but wet pots should on no account be exposed to sudden draughts or the rays of the sun. This process of drying takes from two or three months, after which pots are baked before their removal into the heated furnace.

In these pots with previous glazing, the mixture of raw materials is melted into glass. Pots are not required, if there be a tank furnace.

### Annealing Ovens.

These are for the purpose of cooling glassware or crude glass gradually with a view to eliminate the danger of glass developing brittleness.

### Tools.

These consist of shovels, ladles, blowing pipes, moulds, roll-shears, tongs, scissors, emery wheels, cutting implements, and water troughs, including a few more shaping tools.

### Raw Materials.

Sand, lime, and coal

### Chemicals.

Antimony, arsenious, barium, oxides, minium, flourspar, borax, chrome oxide, cobalt, copper oxides, manganese dioxide, soda, potash, selenium oxide, uranium, tin oxide, zinc oxide, and cryolite.

The materials mentioned above are mixed in different proportions to produce glass of various colours and qualities. A few of the



principal materials may be discussed for the information and guidance of prospective glass manufacturers

### Fireclay.

The Ambala Glass Factory was built with fireclay and bricks imported from Germany. At that time the products of Jubbulpur factories were not known intimately. But experience has shown that fireclay and bricks from Jubbulpur are as good as those imported from Europe. In using these indigenous goods there is saving in expense with an assurance of quality, and they may be relied upon in standing the abrasive and expanding heat of a glass furnace under gas fire.

### Silica.

Is made up of silicon and oxygen and is met with everywhere under the common name of sand. Ordinary sand is used in certain colours, like blue and green, but is unsuitable, on account of its impurities, for white glass of a better quality. Sand for white glass should not contain more than 5 per cent ferric oxide. Sand of inferior quality, but workable, comes from Dehra Dun, Kalanour (near Rewari) and Bikanir (Palana).

### Lime

Is made from limestone. For making a fine quality of glass pure marble, free from iron, is powdered into dust and used in glass, along with alkali, to assist the thorough fusion of the materials through the agency of escaping bubbles of carbon dioxide. If used in excess it hardens the metal.

### Coal

The question of fuel is of great importance in glassmaking. Proximity of coal tends to reduce the fuel bills of a glass factory and assists in its extensions and development. Coal brought from a distance at considerable expense hampers the various operations and adds to the initial expenses of production. A good quality of coal producing a long flame free from smoke or soot is much in favour with glass makers. It is utilized in different ways in different furnaces — (1) When the flame enters the bed of the furnace and heats up the covered pots by playing around them, or (2) when gas produced from coal makes a flame. Fuel in the gaseous form is cleaner, more easily managed, more regular, and gives greater heat than coal burnt direct under the pots. Therefore coal that yields a larger amount of gas should be preferred.

## Chemicals

### SODA.

Carbonate of soda occupies the premier place in the making of glass. It should be free iron Potash is very costly, and though it gives better quality of glass, it is not available for general use. Salt has also been tried in the crude form, but it has been found to produce undesirable defects, and had to be abandoned Carbonate of soda produced on the ammonia process has been found to answer well and is generally used by glass-makers Brunner Mond's soda ash is in general use in India

### OTHER CHEMICALS

The most important chemicals that enter into the composition of glass of various colours and qualities are those enumerated above under the head of chemicals Out of these the oxides of manganese, lead, antimony, arsenic, borax, barium, selenium and saltpetre are used in small quantities in making white glass, the remaining oxides like those of chrome, cobalt, copper, iron, manganese, tin, and uranium are used in producing coloured glass Cryolite is used in producing milk glass

## Composition

### MIXING OF RAW MATERIALS AND CHEMICALS

Glass-making is essentially a chemical problem. Glass is made from sand, sodium carbonate, or potassium carbonate, lime or lead oxide, baryta, and to these are added invariable proportions, as colouring agents, oxides of metals, such as cobalt, copper, chromium, iron, manganese, sulphur, tin, zinc, &c, as well as carbon, nitrates, and borates, &c. These materials are of variable purity. The greatest caution is necessary in their employment Iron as an impurity gives the most trouble, it may be present in sand, soda, or lime Copper may also be present in sand Iron gives green colour to glass, and is oxidised by nitre or manganese

But glass made purely from sand and potash or soda, though transparent, would be difficult to work A second base, either lime or oxide of lead has to be added Lime gives the working qualities and makes glass tough On the other hand, the presence of lead tends to make a soft and brilliant glass

Glass made from potash and lime is the most difficult for fasion, is soft, colourless, and is the least attacked by chemical re-agents. Bottle glass is a silicate of soda and lime, contains variable quantities of alumina (from pots) and iron (from ordinary sand) as impurities, is less friable, and it varies in colour from green to brown, and is less easily attacked by chemicals

Glass is coloured in the following methods. Colouring materials are added dry to the mixture or the oxide is first melted in borax and then added to the liquid glass, or the colouring materials are formed into a paste with ferric oxide as a medium, and thus painted on glass, which is then heated to redness. The last method consists in reheating the object which contains already the colouring substances

Manganese gives beautiful colours, if the glass contains soda the violet becomes reddish, and with potash it is bluish. Green is obtained with the oxides of copper, chromium and the protoxide of iron. Large quantities of copper, cobalt, or ferric oxide give black, but the most beautiful black is obtained with the sesquioxide of iridium. Silver chloride or uranium gives brilliant yellow

Sand, soda, and other ingredients are weighed in certain proportions and intimately mixed with manual labour or mechanically in a rotating drum. This mixture may be fritted or not before its introduction into the pots. The second charge is not made until the first has become molten liquid, and so on. To this mixture cullet or broken glass is added with a view to expedite the fusion of the metal, and is a great saver of time and fuel

The excellence of glass consists in its freedom from bubbles and glass gall or sandiver, and depends upon good melting, the quality of the fuel, the efficient management of the furnace, with a general knowledge of the chemistry of materials used, and the skilful handling of the processes of manufacture and of operatives

### Glassware

Articles of glassware may be made by a workman—

- (1) by collecting glass on one end of a blowing pipe into a mould,
- (2) by blowing the gathering on the pipe into a mould,
- (3) by dropping a given quantity of molten glass into an automatic blowing machine, and
- (4) by pressing into a mould ;

People who have been into a glass factory might have seen the 1st, 2nd, and the 4th processes being performed. But there may be a large number of people who perhaps have never seen a glass factory at work. For their information I quote from Mr Dillon, whose description of blowing by the breath of mouth is exceedingly graphical. The molten glass is collected on the extreme of a blowing iron (pipe) to form a gathering. This gathering, while still in soft condition, is rolled upon the marver into a cylindrical mass. By blowing down the tube, this mass is now distended to form a hollow pear-shaped vesicle and it is from this vesicle that a start is made to form by a spinning or flashing process a sheet of broad or crown glass, again the vesicle may be made to assume a cylindrical shape, and then opened out to form larger sheets of glass, or finally by holding the blowing iron to which the bulb of glass is attached in a vertical position (or sometime by swinging it over the workman's head), and then by shaping it by means of certain simple tools, the vesicle is started in the course by which it will finally be converted into a bottle or into a bowl-shaped vessel. It is evident that so long as the glass is attached to the blowing-iron (pipe), although a simple bulb-shaped vessel may be formed, there is so far no means of shaping or finishing the upper portion. Before this can be done the further extremity of the vesicle must be attached by means of a small gathering of molten glass to a light tapering rod of iron, the pontil. The vesicle is at this stage removed from the blowing iron by wetting it off by means of a rod of moistened iron. The glass vessel, now attached by its base to the pontil, is reheated, and the further treatment taken in hand by a workman seated on a stool with long projecting arms, on which (or on the knee of the workman) the pontil is rotated. The shaping is chiefly done by an iron instrument called the procello or spring-tool, formed like a pair of sugar-tongs by two blades connected by an elastic bow. Finally the edges are finished off by shears and scissors of various forms, which cut the hot glass as if it were a piece of soft leather. The new finished vessel is removed from the pontil by wetting the point of attachment, and is taken to the annealing oven.

### Blowing Machines and Presses.

The blowing machines have yet to come to India. The process, as described by the inventors, may prove an interesting reading — The primary object of this machinery is to dispense with human

blowing and its attendant mouth and lung diseases, which are frequently followed by early physical deterioration. A blowing machine, which in other words is a press served by an air-compressor taking the place of human breath, works with a preparatory mould (with neck mandrels entering from below) acting in conjunction with two finishing moulds disposed upon a special turntable, having four nozzle tongs and four mandrels.

The machine is simplified to such a degree that the workmen require no physical exertion at all. Skilled blowers are no more indispensable. The few phases of the work are most automatical.

The machine requires one gatherer, who transfers the molten glass from the pots or the tank into the preparatory mould, one man at the preparatory mould to cut off the glass, turn a small lever and hand the raw bottle over into the finishing mould, one youth at the finishing mould turning the hand lever and taking the finished bottle out of the mould.

All shapes and sizes of bottles can be made by the machine. The moulds can be exchanged within a few minutes. The necks of the bottles inside as well as outside are always regular.

Three men per shift of 10 hours suffice against 12 skilled blowers for the same quantity blown by mouth.

The air compressor requires 3 H P.

### Emery Wheels

These wheels, worked by hand or power, grind to polish the rough edges of chumneys, globes, and wide mouthed jars. They may be put up vertically or horizontally with arrangement for fine wet sand to dribble over them to assist in the removal of rough surface and bring on fine polish.

Edges may also be fire-polished, presenting a velvet touch to the fingers. This process has not been adopted as yet in India.

### Manufacture of Bangles

The indigenous manufacture of bangles is carried on by the workman by gathering the requisite small quantity of glass upon a sharp-pointed iron rod, and spinning it by rotating in the fire till the ring opens out to form a bangle, when he takes it out to slip over a conical mould, which gives it the required size.

In Austria and at Jubbulpur bangles are made in multiple moulds each containing from 4 to 9 bangles. The molten glass is dropped into a mould and pressed into shape. These cups are taken to the annealing oven, from where on cooling they are taken out to be cut into units by a cutting machine with diamond points and then passed on to grinders, and from them into heated muffles to be fire-polished at the edges. Bangles made in this way are superior in finish and are more attractive in appearance than those made according to the indigenous method. Mould-bangles are becoming the fashion in the market, and are displacing old types. If our bangle-makers were assisted with small presses, moulds, and the cutting machinery, and were taught the method of fire-polishing in muffles, their manufactures would derive away the foreign makes and be the means of placing the *Minhar* class on progressive commercial footing with profit to themselves and fair prospect to the industry.

### Difficulties : their Remedies

In the foregoing paragraphs difficulties in glass making have been pointed out and where possible, suggestions have been made as regards the way out. It is proposed to sum them up briefly for the convenience of our readers.

#### DIFFICULTIES.

(1) India imports twelve times more glassware than she produces in the country.

(2) Capitalists are reluctant to invest in this industry.

#### REMEDIES

(1) A sufficient number of glass factories should be built up to displace this enormous import and to meet the local demand.

(2) Their ignorance of the essentials of glass-making may be removed by a broad-cast publication of the experiences gained by the existing manufacturers. Plans of up-to-date furnaces, sources of raw materials, data of first costs, average sale prices and profits, and analysed samples of materials and chemicals may be made available in the office of the Provincial Director of Industries, as well as addresses of manufacturers of labour-saving machinery with printed literature thereon.

(3) Scarcity of capital for expansion of business and extension of works in a factory

(3) A provincial industrial bank patronised by Government and the intelligent public, working with district co-operative societies as branches may be established to afford financial aid to deserving industries

(4) Inefficient management.

(4) Existing glass factories may be approached to allow the training of educated youngmen as managers, foremen of works, and intelligent labourers as skilled workmen in consideration of reasonable grants-in aid by the Local Governments and payment of premiums by additional apprentices. The men under training, when doing efficient work, should be paid for their services at full prevailing rates. Training of a manager should not be undertaken unless he is assisted by a present or a prospective glass manufacturer. On completion of training, certificates of competency or service may be granted over the joint signatures of the Provincial Director of Industries and the glass expert of the training factory

(5) Training of skilled labour drawn from the hereditary or other classes

(5) In addition to the training given in factories, workmen of the hereditary *Minha* class may be encouraged to carry on the manufacture of glassware as a cottage industry whereat unassisted training of their own people will be promoted as a matter of self-interest. Labour so trained, if not absorbed by the cottage workers, will flow into factories by the attraction of good wages. As everybody cannot be a manufacturer by himself, he will seek factory employment and prove a desirable addition to the skilled labour of a factory

Where a cottage worker is assisted with funds by a co-operative society under the guidance of an industrial bank, as one of the conditions of a loan within the period of its currency, may be made the provision of facilities for training a certain number of workmen drawn from his neigh-

bourhood or elsewhere The apprentice may be nominated by the creditor bank or society and to be paid a subsistence allowance by the employer

(6) Labour-saving machinery

(6) Automatic blowing machines and presses are costly contrivances These may be provided by the Local Industries Department direct or through the agency of a co-operative stores The introduction of these machines will effect an appreciable reduction in the number of blowers now required by factories and will assure standardised production In fact, these will dispense with blowers, who will thus be compelled to take seriously to their old cottage work, or accept employment in factories not provided with automatic machines

(7) Industrial stores dealing in indigenous manufactures and their component raw materials

(7) When labourers are thrown off their work by the advent of automatic machines, they shall have to be assisted to carry on their old occupations on improved lines They will require loans to purchase materials for making modernised furniture, tools, and ready mixed raw materials for making glass and glass-ware The industrial stores may be established in every province to stock and sell raw materials and ordinary tools These stores may be established partly as the result of patriotic sacrifices and partly assisted by Government aid in the matter of guaranteeing a certain percentage of interest on the total investments If conducted on this principle, these stores will prove of immense benefit to small manufacturers who for want of funds are not in a position to purchase the necessary raw materials and tools at cheap rates These stores may be made to cater for a number of deserving industries on the basis of cash payments Loans by the industrial bank to small manufacturers may be advanced on the condition that they are spent through the agency of industrial stores, which will ensure their right and



economical application, with the further condition that instalments of the payment of loans may be secured through these stores.

(8) Freights on raw materials and manufactures

(8) Freights require revision and considerable lowering down so that it may be possible for an inland factory to compete with goods imported from foreign countries on the sea-ports of India. The lower rates may be charged for a number of years, within which an industry may be expected to grow to its full strength. But under no circumstances should it be the policy to allow low rates so as to allow it to reach maturity and then to blast it down at once with high prohibitive freights.

(9) Government patronage

(9) There is no doubt that nascent industries require protection in some way or the other. Raising of tariff walls is inadvisable in the case of India with the export balance in her favour. It may bring on retaliation and reduce the volume of her exports. The Government and railway are the biggest customers. Their patronage of an industry will not only secure a great demand, but it will bring about a tremendous consumption of indigenous goods by the public, which always acts on the Indian proverb "Do as the rulers do." If the Government can extend its patronage, the industries will ask nothing more for the present. Of course equal prices and quality may be made the criterion of patronage. Neither more nor less is expected, fair treatment is the sole nourishment that an infant industry needs to attain to full growth.

#### DIFFICULTIES

(10) Co-partnership and profitsharing

#### REMEDIES

(10) It may be taken for granted that none of the aforesaid difficulties exists. But what about the human nature? Can you change it by any patent medicine? It is impossible to carry on a business successfully if you prevent men from having a share in the profits which their industry

has created Piece-work may be a good substitute for co-partnership in production, but the former does not go far enough, it limits a piece worker's interest to a day's work and no more. But co-partnership in production extends the general sense of responsibility in the managers, foremen, and skilled labourers. They are interested to increase the output by improved methods from year to year.

There are two ways to reconcile labour to the operations of capitalist. The first consists in allowing the works manager and his chief workmen to produce goods at their own cost and to sell them to the sales department at rates leaving a margin for the costs of packing, rebates to traders, and remuneration of the selling agency. Rates allowed to the manufacturing department are governed by the rise and fall of the market, and that arrangement causes no grumblings.

The second method may take the shape of an issue of nominal capital share certificates, entitling the holders to 10 per cent of the net profits after dividends on actual capital have been paid. These unnegotiable certificates may be issued to deserving workmen by a select committee of the employers and the employees. The rate of 10 per cent is calculated on the amount of the salary or wages that an employee receives from the factory.

(11) Good sites

(11) A capable manager, with a keen eye for the prospects of an industry, should at once turn his attention to the selection of a good site for the location of his factory. A good site for manufacturing processes includes an easy accessibility to raw materials, suitable conditions of climate, and facilities for the cheapest distribution of manufactures.

(12) Trade mark. (12) Trade marks are conspicuous by their absence on goods manufactured in India. A low

unreliable quality is the cause. Goods produced to standard quality, with a distinguishing mark fixed thereon, gain good or bad reputation. If an article bearing a certain trade mark is accepted as of reliable quality, it becomes popular with the consuming public and proves a source of profit to the manufacturer, or it may prove the reverse. But gains go hand in hand with risks, it is advisable in the interest of the manufacturer that he should attempt to secure good reputation and thereby a large market for his manufactures. Articles without trade marks never bring repeated orders, substitutes similar in appearance take their place, and cause a loss of probable customers.

### Conclusion.

It is said that success in business is highly uncertain. Where one man fails another succeeds. It is a question of methods. Some produce goods cheaply than others. Good sites, cheap raw materials, better plants, better organization, assemblage of cheap and efficient labour, and command of sufficient capital under the guidance of scientific management in close sympathy with its workmen are factors that eliminate apprehension of failure. Irregularity in the conduct of manufacture, due to over-production, scanty capital, desertion by skilled labour, unsaleable goods, cut throat competition by foreigners, or a breakdown in the plant, should be avoided by foresight. Initial production on modest scale will give you time to study these problems and save you from much heart-burning, if you are ever overtaken by trade crisis, or derangement in the factory.

Whatever contributes to increase the efficiency of a workman should not be disregarded or put off. A workman should be comfortably housed, and better paid, and otherwise treated with sympathy so that an attachment to his employer and his employer's work may take a deep root in his heart, and make him sorry to ever sever it. Bonds of attachment are closely made through self interest on either side. When a workman knows that in addition to fair wages, he shall get a share in the profits, he works to the best of his ability, and is led thereby to increase the profits of his employer.

Different schemes have been devised to benefit the workmen by different employers. Any one of them may be adopted under mutual agreement between the employer and the employees.

Production on a large scale with the help of labour saving machinery is displacing small manufacturers and manual labour. When automatic machines are introduced in India, glass blowers will be thrown off their work to a large extent. They should not be allowed to starve. Means have been suggested to let them start, on improved lines, their cottage work. Credit facilities by co-operation, free supply of technical advice, and an agency to sell them raw materials and purchase their outturn, will solve the difficulties of cottage workers. A local Government can assist these people and promote their cottage industries by legalising loans from co-operative banks and the establishment of industrial stores.

Banks are the only institutions that come into close touch with capitalists or people wanting loans. A bank in which the public has confidence attracts large and small deposits, and if it be managed by a board of directors consisting of experts and select men of business, it will prove the means of diverting capital to deserving industries and will bring together monied and intellectual classes. It does not matter by what name you call it. A bank of this type will prove the strongest link between skilled labour and capital, and if established, subject to Government audit, will create confidence in the public mind, notwithstanding the recent failure of certain Indian banks. A large number of new industries, such as soda, sugar, sulphuric acid, varnishes, matches, wood pulp for paper-making, glass making, ammonia, cement, and many other industries, does not stand the chance of being started, if capital remained in less fruitful channels.

There remains now only one last point to be mentioned. Does investment in glass making pay? It does and it does not. If it is carried on, as a chemical industry ought to be, on lines mentioned above, it is worth-while all the trouble it requires, and pays fairly well. But if you follow the wrong course, as pointed out in the first para, you are sure to come to grief. If you disentangle the web of difficulties in the manner indicated, you may earn the reward for your labours, and may further derive instruction and amusement from being a glass manufacturer. Mysteries of chemistry, when successfully solved, furnish both in abundance.

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# The possibilities of the Perfume-industry in India.

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India is a country of raw-materials The natural resources of this vast country are extremely varied and extensive But it is a sad commentary on our capacity for industrial enterprise to have to notice that in spite of nature being so lavish with us, we have to depend on foreign countries almost entirely for finished products We are even to-day hewers of wood and drawers of water, though we were not so in the good old days of Asoka or Chandragupta. We have failed to keep pace with the march of civilization. It is now apparent to all students of sociology that civilization as it is understood now, is measured largely by the extent of the scientific and industrial advancement of a people

Generally speaking India's raw-products have so far been either altogether neglected or (in cases where they have been exploited) have gone to foreign countries to be worked up there into finished products

Perfume yielding materials are a striking example Our flowers and other odorous substances of a perishable character are wasted with the exception of a very small fraction utilised in the manufacture of Indian attars, and fragrant waters No systematic effort has so far been made to build up an industry which would aim at manufacturing essential oils which would command the world's market.

Aromatic seeds, roots, and other odorous substances, which do not deteriorate readily on keeping, have, however, found their way out of India, and have been successfully utilised in foreign countries for the purpose for which they were designed by Nature

The following table gives some idea of the exports from India of perfume-yielding materials during the last few years —

*Export of Perfume-yielding materials from India*

NAME	Quantity in Cwts		Value in £ Sterling.	
	1913-14	1914-15	1913-14	1914-15
Ajama	4507	2609	2953	2045
Ajwain ..	9784	7368	2983	2736
Aniseed	1129	835	931	977
Assalia	505	170	418	133
Coriander	95533	84058	39099	46337
Cumin	19026	13554	29338	25698
Do. Black	1313	1411	1157	985
Fennel ..	15256	4223	11348	3446
Fenugreek .	12760	18300	7301	10161
Sawa or Dil .	2090	1945	1489	1351
Other sorts .	147	39	192	43
Total ...	162050	134512	97209	93903

It would have been some consolation, if our activities had been confined to exporting these materials and if we had not imported them back in the form of finished perfumes. But our consumption of European perfumes has increased notably of late and we have during the last few years become fairly large buyers of western perfumes. During the year 1913-14 the value of perfumery ( not being Perfumed Spirits ) imported into this country amounted to £ 33,471

The perfumers of Kanauj had largely given up the preparation of attars directly from flowers, as they found it more convenient to make them by thinning down concentrated essences which they

could buy from Germany The "Heiko" brand of concentrated flower essences was selling largely in Kanauj—this mixed with bloomless oil would give almost any attar with the minimum of trouble and expense though naturally at the cost of quality

Since the stoppage of supplies of these essences, there has been a revival in the indigenous industry of Kanauj The principal centres of the perfume industry in the United Provinces are Kanauj, Jaunpur, and Ghazipur The process employed at all these places is very crude The apparatus consists of a Still (or deg) which is connected by a bamboo-pipe to the condenser which latter is kept in a trough containing water There is no worm arrangement in the condenser, as is the case in all modern condensing appliances The Still is set in a furnace, and the flowers are put into it and covered with water The heating is done by direct fire, there is no wire cage or false bottom to hold the flowers and consequently it is not unoften that flowers get burnt during the operation of distillation This tells seriously on the quality of the ultimate product. There is always loss of odoriferous vapours on account of leakage and unsatisfactory condensation. There is much room for improvement in the country still, but most of those who are engaged in the industry are extremely conservative and slow to adopt new ideas One distiller had somehow got into his head that if hot water was used in the condenser the quality of the perfume was much improved He told me that he had been trying the experiment for some years with ( what he believed ) extremely successful results He could not be persuaded to discontinue this obviously wasteful procedure

With the exception of perhaps Sandalwood oil, only small quantities of pure essential oils are made in India Attars, fragrant waters and perfumed oils are the three principal lines of the indigenous industry

Attars are preparations of the more fragrant essential oils absorbed in Sandalwood oil The receiver contains the Sandalwood, oil base in which the essential oils brought over by steam from the still are absorbed The watery layer is separated, from the attar, which latter floats on top Attars derived from Rose, Keora, Henna, Khus, Joohee &c. are those which are commonly made in this province. Although essential oils are not soluble in water to any appreciable extent, yet traces of them which are left in the

condensed water from the still render this water highly fragrant. Such fragrant waters, specially those derived from Rose, and Keora are largely sold in India

Perfumed oils are prepared by a process of enfleurage Til seeds which have been previously cleaned and husked are used to absorb odours from flowers The oil afterwards expressed from these seeds has the smell of flowers, due to the well-known property of fixed oils of absorbing essential oils The odours extracted by this process are very much better than those obtained by distillation. Heat has always a deleterious influence on the quality of odours, and consequently for preparation of the best essential oils the enfleurage process is now largely used in Europe in preference to the distillation process

The manufacture of attars as well as perfumed oils is carried on in this country in a most wasteful and unscientific manner. I have already referred to the defectiveness of the apparatus used for distillation It should be within the power of every small manufacturer to effect a few simple improvements which are so imperatively called for The still should always contain a wire cage to hold the flowers to be distilled This would save charring and the consequent deterioration of the quality of the perfume. The condenser should be provided with a worm and should have a constant circulation of cold water At least one improved still has been installed by a manufacturer in this province and is said to be giving very satisfactory results Sandal-wood oil is becoming very expensive and research is needed to find out other bases Indian Geranium or Rosha oil has been suggested as a very good base for attars if its strong odour could be softened This question is engaging the attention of my laboratory

The use of bloomless oil in connection with attars is most reprehensible and should be strongly deprecated.

No attempt has so far been made to prepare essential oils by the modern enfleurage process In Europe, specially purified lard is used as the medium to absorb perfumes from natural products In India on account of religious prejudices of the people the use of any animal fats is out of question My laboratory has given much attention to the investigation of vegetable oils with a view to their use in the perfume industry. It is a mistake to use the unerushed seeds for absorbing odours, because when afterwards oil is expressed



from them, it is invariably contaminated with much resinous and colouring matter and other impurities. It is most necessary to use the purest oil which has been completely deprived of its taste and odour. We in this laboratory, have been able to find out at least one such base which has given very good results. A note on the subject will be issued by my department in due course. Since vegetable oils are mostly liquids they cannot be used as easily as solid fats. A suitable apparatus is needed which would enable the oil to circulate through the flowers so as to extract all traces of the essential oils contained in them. One such apparatus has been devised and is now being installed in this laboratory.

For the separation of essential oils from the oil or fat used to absorb them it is necessary to use alcohol which dissolves out the essential oil leaving behind the fixed oil.

This department is in correspondence with Government regarding the possibility of obtaining, under suitable safe-guards, duty free spirit for use in a Central factory which it is proposed to establish at Kanauj. The matter is still under consideration. Too much stress cannot be laid on the quality of spirit used in the perfume industry. So far none of the distilleries in India have been able to offer a spirit which could be passed as suitable for this special purpose. The requirements of perfumers are very exacting. The spirit must be "silent" or absolutely devoid of odour, like Cologne spirit. Most of the rectified spirit made in India is very far from being odourless. As a result of experiments carried out in this laboratory fair quantities of "silent" spirit have been prepared, and attention is now being given to the possibility of obtaining such spirit from a distillery.

I have referred to the proposal of starting a model factory at Kanauj for the manufacture of essential oils. This proposal originated with the Hon'ble Mr. A. H. Silver, Director of Industries, United Provinces, and is now under the consideration of Government. The capital needed for the venture has already been provisionally subscribed. Nobody who is not already in the perfume industry at Kanauj has been invited to buy shares in the concern.

It is proposed to employ both the distillation and the enfleurage processes, special attention will be given to the manufacture of pure essential oils. This department is already in touch with large buyers of essential oils in London. Several perfume-yielding mate-

rials have been investigated in this laboratory, and many more are still awaiting study. Rose, Keora, Jasmine, Cassie, Vetivert, Patchouly, Harasinghar, are some of the materials which have given most promising results.

There are many seeds which contain essential oils and which are at present being exported to foreign countries. In this connection mention may be made of Ajwain, Caraway, Coriander, Cumin, Aniseed, Fenugreek Fennel &c.

A note on the preparation of thymol from the oil distilled from Ajwain seeds was published by this department more than a year ago.

Surprising as it may appear, there is a large and profitable industry engaged in the manufacture of Sandalwood oil at Kanauj. The wood has to be brought all the way from Mysore, a distance of about 1500 miles. About 150 tons of wood are distilled annually at Kanauj.

The industry at Kanauj is extremely profitable, if one may judge by the income tax returns, and this in spite of the crude and wasteful methods employed. With the introduction of scientific methods there should be room for great development.

The perfume industry is one which is capable of great expansion and improvement and it will perhaps be of interest to the Conference to know that my department, with Mr. Silver's able and sympathetic guidance, is doing all it can to render help and assistance to the indigenous industry as well as to introduce new methods, and up-to date appliances.

The inauguration of the proposed factory at Kanauj will be a very interesting experiment which is fraught with immense possibilities.

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# Importance of modern inventions and discoveries.

By N. M. SANT, Esqr., L. E. E.,  
*Electrical Engineer, Bombay*

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Among the various definitions of man, the one furnished by Carlyle is perhaps the most ingenious. "Man," says Carlyle, "is a tool using animal, weak in himself and of a small stature, he can use and devise tools, with which the granite mountains melt into light dust before him, he kneads glowing iron, as if it were paste, seas are his smooth high way, winds and fire his unwearying steeds."

This high sounding boast of man's powers, would have appeared highly ridiculous about two centuries back, but so marvellous has been the advancement of the physical sciences during the last century, so many new epoch-making and startling inventions and discoveries have been made that the boast is now fully justified. From the simple crooked stick of the ancient Egyptian cultivator to the thousand and one new forms of the plough, the change is tremendous. The wonderful genius of the mechanists of the last century, the exemplary patience and perseverance of the earlier scientists and inventors under the most trying circumstances, amid obloquy and persecution, are beyond all praise. They have changed the very aspect of modern civilization, revolutionised not only the methods and processes of manufacture, but the very ideals of life. There is hardly a domain of human activity which has not been affected and transformed by the material progress of the last century. It has lengthened the span of human life, mitigated the horrors of and suffering of surgical operations, has combated diseases, and forced Dame Nature to yield her secrets. Modern Science is progressing by leaps and bounds and is ever yearning after perfection. Its goal is continuously shifting with its advance and is as limitless as nature herself.

Within the short space at my disposal, it is not possible to describe in detail the changes introduced by modern science and modern discoveries and inventions into each branch of human activity. I may, however, notice some of them in brief for the benefit of my countrymen.

### *Agriculture.*

The principal implement of agriculture is the plough. Till the 18th century, no attempt was made anywhere to improve the plough and introduce its modern forms and the credit is due to Holland for the first idea of making plough with cast iron shares. Since then such has been the progress in this line, that in the United States alone nearly eleven thousand patents on ploughs were issued in the 19th Century. Thus millions of acres of land have actually been brought under cultivation by the improved steam and electric ploughs. All kinds of seeds different sizes as well as fertilizers can now be sown separately or together by the modern sowing machines. Planting of extensive fields of potatoes has been greatly facilitated by machinery, that first slices them and then sows these slices in continuous rows or drops them in separate spots as may be deemed convenient. The smallest seeds are sown with precision without injury to them in any way. Transplanters as well as planters have been invented, which will dig the plant trench, distribute the fertilizer, set the plant, pack the earth and water the plant automatically. These are only a few of the wonders of agricultural machinery. The harvesting, winnowing, threshing and reaping of crops is done now automatically. The ginning and baling of cotton, the preparation of grain and fruits for food, cleaning, separating, grinding of wheat and other grains is now rendered easy by machinery.

### *Chemistry.*

The triumphs of modern chemical researches and their practical application are not less notable. Chemistry has come to the aid of agriculture by discovering new processes of fertilizing the soils. The purification of liquids, oils, sugars and fats, bleaching, dyeing and glazing of fabrics, the introduction of artificial light, art of perfumery—all these have been revolutionised by the discoveries of the modern chemistry.

### *Medicine and Surgery.*

Advancement in an aesthetic antiseptic treatment of wounds, manufacture of artificial teeth and limbs construction of a vast variety of surgical instruments, suited to manifold requirements, new methods of relieving physical pain, are all the direct results of modern discoveries,

*New Forces.*

It was in the 18th century that Dr. Darwin of Lechfield, the poet, had sung the following prophetic lines '—

“ Soon shall thy arm, unconquered steam, afar  
 Drag the slow barge, or drive the rapid car ,  
 Or in wide waving wings expanded bear,  
 The flying chariot through the field of air.”

Who can say that this bard was not inspired? Every word that he wrote has become true Steam was used originally for pumping water Jonathan Hulls patented in England in 1736, a massive steam engine and William Henry of the United States of America, tried the construction of model steamboat in 1763 The brilliant inventions of James Watt utilised steam power for various purposes other than mere pumping and harnessed this power for a variety of uses undreamt of before.

Gas, oil, water, hot air have also been subjugated by man and they are now competing with steam power But the practical applications of electricity are so wonderful that a day will come when electricity bids fair supplant all the other known powers in the service of man.

*Electricity.*

It would be out of place here to trace the history of the development of the science of electricity or to forecast its future I shall merely indicate briefly the practical applications of this power, to give you an idea of the wonders which it has already wrought.

*Domestic use.*

- (1) Washing (clothes and utensils).
- (2) Lighting.
- (3) Heating water.
- (4) Heating Rooms or Halls.
- (5) Cooking purposes
- (6) Drawing water.
- (7) Driving of fans.
- (8) Call Bells.
- (9) Telegraph (with or without wire)
- (10) Telephone (            do            ).

*Factory work.*

- (1) Spinning and Weaving
- (2) Crane or lifting work
- (3) Draving lathes, planing, shaping, carpenter's work &c.
- (4) All other work which could be done by steam, oil or gas engines

*Traction power*

- (1) Motors for conveyance of passengers
- (2) do. for conveyance of goods
- (3) Tramecars,
- (4) Railways

*Agriculture*

- (1) Fertilization of soils
- (2) Milking of Cows.
- (3) Pumping water.
- (4) Ploughing and other operations for which steam was used

There are numerous other branches of human activity which have been affected by modern science and modern inventions including the methods and munitions of warfare.

The above is only a bird's-eye view of the field covered by the modern science, modern invention and discoveries. In the midst of all this material, scientific and mechanical progress, can India with her teeming millions afford to stand unmoved and remain where she was centuries ago? Japan which introduced University Education after the models of the European institutions 50 years ago, almost simultaneously with the foundation of Indian Universities, was quick to perceive that mere literary and academical education would neither satisfy the needs of the century nor increase the efficiency of a nation, if it has to survive in the fierce struggle for existence. Japan was shrewd enough to open industrial and technical schools and colleges first with the help of foreign experts, with the determination of gradually replacing them by her own trained people. Such is the efficiency and adaptibility of this small nation, that it has completely mastered and in some branches even improved upon and surpassed the methods of Western civilization, whereas Indian Universities until recently continued 'o be mere examining bodies of academical courses, after the original model of the London University. After the experience of nearly half a century of the

unproductive and inefficient character of the literary courses, there is still a mania for this kind of education, and each province is even now vying with the other in collecting funds for starting literary universities and arts colleges of the old discarded type. With the exception of a few important cities on the sea coast, the rest of the country is far removed from the contact of industrial or mechanical activity and the Indian masses and even the so-called educated men, who inherit the literary traditions and tendencies of their forefathers are quite oblivious of the tremendous changes that have completely transformed the old ideals and modes of life. Our people have a dislike for manual work and therefore fail to realize that each invention and discovery which in course of time reaches the prince and the peasant alike, was the product of an exceptionally fine intellect, the result of sustained perseverance and self-sacrifice, mental and physical labour, which are beyond conception. The man who invented the spinning mule or the Steam, Gas or Oil Engine is possibly an equal, if not a greater benefactor of his race than the man who discovered the Rules of Syllogism.

While pointing out the importance of scientific studies, I would be failing in my duty, if I were not to allude here to the difficulties of the Indian students, who take up technical courses, and complete their training either here or in foreign countries. Owing to the expensive nature of Technical education, the resources of parents or guardians of these students get nearly exhausted by the time their boys complete the period of their training and to expect the parents to support the boys for one or two years more, till they get a decent post is an impossibility. I would, therefore, exhort my wealthy countrymen and especially the capitalists of Bombay and other prominent cities to throw open their factories to these young men for completing their practical training and also for providing them with a decent livelihood, by utilizing their services in existing concerns and also for starting new ones. In the selection of men, there should be the consideration of efficiency alone and no class prejudice or predilection ought to come in the way. The Industrial Conference under whose auspices we meet here to-day has been urging on the capitalists the need of encouraging young technically-trained students and let that exhortation not be a cry in the wilderness. In Germany and other countries, technically trained people get better remuneration for their work than they could have expected in Government service.

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# Coal-tar Dyes and India.

By LALA BABULAL GOVILA.

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The war in Europe has created a famine of dyes in almost all parts of the world, because Germany, the chief producer of dyestuffs, which supplied nearly four-fifths of the world's demands, has been cut off and because the consuming countries have been unable to meet the demand from their existing factories

All principal dye consuming centres in the world have been rudely shaken by this war, which has made them all a-thinking, "What is it that makes them so cruelly dependant upon one country for the supply of an article which is to-day in all civilized countries considered to be a household necessity and upon which depends to a great extent the existence of a number of prominent and lucrative industries?"

The huge cotton mill industry of the world, not to speak of other industries of serious dimensions in which dyes are indispensable, for instance, wool and leather, has almost been paralysed and consumers whether large mill owners or small families, have equally felt the pinch of high prices that have steadily been on the rise during this war, until to-day we find that the dyes which could be procured in the market for ten annas a pound can be had with great difficulty for Rs 20, per pound that is to say, the prices have gone up by 3200% Germany's supremacy in the field of dyes has remained for over 30 years a standing challenge to the chemists and capitalists of the whole world, in spite of the fact that England was the country that produced William Henry Perkin (an Assistant Homman of the Royal College of Chemistry of London) who was the inventor of the first dyestuff derived from coal-tar. The first dye got out of coal-tar was mauvein (Perkin's violet) and that was in the year 1856 The first country that established a dye factory for the manufacture of dyes from coal-tar products was France, and this was in the year 1858 The idea of manufacturing dyes from coal-tar was taken by Germany from the inventor of England and from the manufacturers of France.



The early history of this industry is one of wonderful development in French hands, but up to the year 1870 the complex mechanism of the re-actions that gave rise to the new products was not at all understood. The percentage, composition and exact arrangement of the molecular structure of these dyestuff were unknown. Organic chemistry passed about the above time through a period of rapid development owing to the impetus caused by the adoption of the theories of *valancy* and of *radicles* and the establishment of the theory of *empiricism*.

The failure of the eminent French scientists in recognising the novel but promising theories, and the readiness which the German scientists showed in applying these theories to practice and the persistence with which they finally succeeded in their endeavours mark the beginning of the huge organisation of dye manufacturing industry in later years in Germany. In other words, Germany, profiting by the lessons taught by the progress made in organic chemistry, left England and France considerably behind. Germany borrowed its methods, views, symbols and language from science and her chemists engaged in the industry thus found a firm scientific basis and a reliable guide with which they did not hesitate to launch out resolutely in the way which led them to their great discoveries.

This is the brief history of how a great industry having undergone a period of expansion in France as well as in England went across the frontier and established itself in Germany.

Germany's advantage lay in the fact that she had an army of highly trained chemists who were the products of an elaborate and well-thought-out scheme of technical education and who received from their Government encouragement and facilities in conducting research.

The innumerable gas works which were and are scattered all over Germany proved generally helpful to a great degree in the cause of this industry as the natural desire of the German scientists to make use of the by-products of coal-tar, led them to undertake a number of researches which ultimately have proved to be the main pillar of the German dye manufacturing industry. It may, however, be noted here that Germany could not procure from its gas works, coal-tar of a uniform standard quality and this undoubtedly remained for some time a great stumbling block in her way of organising

this industry on an economic basis, but Germany found in English collieries a great source from which she could procure coal-tar in large quantity of standard composition

Germany's extensive researches in producing intermediate products from Benzene, and other hydro-carbons extracted from coal-tar put them in possession of facts and resources which other countries lacked and which are to a great extent responsible to-day for Germany's superiority in the field of colour-making.

At the commencement of the war, the number of dye works that supplied the world market with colour were as follows —

In Germany	...	22
„ France	.	11
„ England	.	11
„ America	.	9
„ Austria	..	4
„ Switzerland	...	4
„ Holland	.	2
„ Russia	..	2
„ Belgium	.	1
„ Greece	..	1
and „ Italy	..	1

In the course of development of this business 16 plants that make coal-tar dyes have abandoned this work and 14 have been absorbed by other works—thus there remain only 38 dye works in the world.

The colour-making factories outside Germany, owing to Germany's overwhelming superiority in this respect, depended for the supply of a number of their intermediate products upon that country whose economical methods enabled her to out-rival all other countries

During the war England and America have both been strenuously endeavouring to extend their dye-making factories so as to be independent of Germany for their supplies. In England shortly after the war commenced, the Board of Trade framed a scheme to put this industry on a national basis and the Government came forward with promises of generous help in the shape of financing the industry and by setting apart a sum of £1,00,000 for research work. One main feature of this scheme was that the consumers and the

manufacturers of the dyes were asked to subscribe to it, so that the new enterprise might work on a co-operative basis. The existing colour works in England were taken up under this scheme for extension and the well-known English Chemist, Mr Green who has devoted his life to researches in this line, has been asked to conduct further researches with a view to find out those secrets which remain up to date the monopoly of Germany.

This national scheme, however, gave rise to a good deal of controversy and the following arguments as regards the future of the industry were put forward —

- (i) That a huge national organisation like this will seriously cripple private enterprise and kill all competition.
- (ii) That unless the Government undertook to protect the industry by levying heavy import duty on dyes after the war, Germany would soon be able to kill his enterprise.
- (iii) Opinions were expressed that in the face of huge organisation of Germany, a concern started with a modest capital of 3 million sterling would not be able to seriously grapple with the situation and enable England to face German competition after the war.

There is a good deal that can be said in favour of all these arguments. But not even all of these arguments collectively form a case against the organisation of a national concern in England. Industries to be established have to be protected. Strenuous efforts have to be made to make good the lost ground and this can only be done by gradual, patient and persistent work, while there can be no surer guarantee to the success of the work, than co-operation between the manufacturers and the consumers.

France has followed the example of England and recently a French National Dye-stuff Syndicate has been formed with the capital of £16,00,000 to co-operate with British dyes.

America has similarly undertaken the question of extending its colour industry and the United States Government expert, the well-known Dr Thomas H. Norton has been able to discover a new process by which, it is said, the American colour industry will be revolutionised. He has produced colours comparable in brilliancy and durability with those of Germany, out of waste products of petroleum.

Coming to Asia, we find that Japan which is the premier industrial country in this continent, has thought of starting a company for the manufacture of dye-stuffs with a capital of ten million yen or one and a-half crore of rupees. Factories are to be built at Tokio, Osaka, Fukuoka and all those companies which manufacture gas or are engaged in the manufacture of medicine and perfumery have purchased shares.

The Government has come forward to help the concern by guaranteeing a profit of 8% on capital outlay as also by placing at the disposal of the concern 2,400 tons of Benzole, produced by the Government steel works.

We thus see all round us the great interest that has now been aroused in this important industry in almost all the principal manufacturing countries of the world.

When we come to our own country, India, we find that although we are one of the great dye-consuming countries of the world, no serious attempt has so far been made with regard to the manufacture of dyes. No doubt, the shortage of dyes caused by the sudden short-age of imports has led to our falling back upon our own natural resources, namely, vegetable dyes. But let us understand that our demand for dyes is now so huge that not even a fraction of it can at present be met from this source, even if we were to put the maximum of our efforts in deriving our supplies from natural resources.

Such attention as has been paid, during the last two years, to the revival of vegetable dye industry of the country, has only helped in creating some public interest in the value of vegetable dyeing materials. But nobody can say that it has in any way helped in relieving the strain caused by the shortage of imported dyes.

The facilities with which the coal-tar dyes are used by the trade have been so great that few dyers to-day care to use vegetable dyes, which do not possess the same advantage as coal-tar dyes in giving standard results. Apart from this, the production of these dyeing materials, has during the last 20 or 30 years undergone a considerable curtailment, as the direct result of growth in the import trade of coal-tar dyes. It is true that during the period of the war, indigo cultivation has been given some stimulus but even in this, there has been no substantial improvement. The fear of the Indian market being dumped by synthetic indigo after the war—keeps back the enterprising capitalists and land-holders from giving their serious attention to indigo cultivation. It is now an establish-

ed fact that vegetable dyes can never come into serious rivalay with artificial and commercial dyes, and so we must continue to depend for the supply of our demand upon foreign countries as long as we are not able to utilise the resources of our own country for the production of artificial dyes. The growing importance of the mill industry in India and the constant increasing demand of the country for dyeing materials for use in factories and cottages point to the urgent necessity of the industrial men of this country giving their serious attention to the important problem of supplying India with the means and ways of producing artificial dyes and investigating such possibilities that exist in this country for the same.

I give below a table showing the quantities of artificial dyes imported into India during the last four years

#### Quantity of Coal-tar Dyes Imported

Years ..	1912-13	1913-14	1914-15.	1915-16.
	lbs.	lbs.	lbs.	lbs.
Alizarine dyes.	81,63,044	64,69,739	37,57,123	1,62,397
Aniline dyes ...	1,00,82,092	97,03,122	41,60,166	5,52,732
Others ...	63,588	73,034	44,718	1,238
Total ..	1 83,08,727	1,62,45,895	79,62,007	7,16,367

#### Value of Coal tar Dyes Imported in thousands of Rupees.

Years ..	1912-13	1913-14	1914-15.	1915-16.
Alizarine dyes	3,565	2,822	1,534	278
Aniline dyes	7,833	7,677	3,165	1,429
Others	84	102	64	2
Total .	11,482	10,601	4,763	1,709

NOTE —The quantity and value of synthetic indigo imported are not included in the above tables. The value of synthetic indigo imported in 1913-14 amounted to about 10 lakhs of rupees.

In the year 1912 and 1913 which was the year immediately preceding the war, we imported coal-tar dyes 1,83,08,727 lbs in quantity and Rs 1,15,00,000 in value which, according to the present market prices would fetch something like Rs. 30 00,00,000. (thirty crores rupees).

Before we discuss the possibilities of establishing an artificial dye manufacturing concern in India and consider the vast resources that we possess, let us explain for the benefit of non-technical men what coal-tar dyes are. Coal-tar dyes, as their very name indicates, are derived from coal. When we burn coal for making coal gas, or coke, we get a by-products termed coal-tar by a process called destructive distillation. By the fractional distillation of the coal-tar, we get a number of oily substances (Benzene, Toluene, Phenol, Naphthalene, Anthracene, etc.). These hydro-carbons with the aid of sulphuric acid, nitric acid and other chemicals are converted into salts known as intermediate products and it is from these intermediate products that we get coloured compounds known as coal-tar dyes. Thus in getting dyes out of coal, we have to pass through three stages which may be described as below:—

- (1) Getting products from coal-tar by distillation, expression, and like operations.
- (2) Treating the coal-tar products with chemicals in order to convert them into intermediate products which are not dyes.
- (3) Converting the intermediate products into dyes.

Amongst what are now termed in the market as coal-tar dyes, there is a class of dyes called technically sulphide dyes. The first dye of this class was obtained not from coal-tar, but by a fusion of organic waste product with *poly-sulphide*, and in the latter stage, a number of shades in this class were obtained by substituting coal-tar intermediate products in place of organic waste. This idea led me to conduct a series of experiments, and I have been able to produce, without the aid of any coal-tar intermediate products, dyes of black, brown, yellow and bottle green shades which are deep and fast.

With the exception of red dyes, Indian mills at present use mostly sulphide dyes which are imported, and which are prepared with the help of intermediate products derived from coal-tar. So far as sulphide dyes are concerned, we are in a position to manufacture them out of indigenous products, even if for some time to

come we are not equipped with the facilities to isolate the coal-tar products

India possesses vast coal deposits which can ensure a permanent and illimitable supply of tar and benzol. Our gas works, though limited, are capable of giving us a fairly good quantity of tar. The coke-ovens at the collieries and the Tata Iron Works are other steadily growing sources of the supply of tar. Roughly one ton of coal yields one pound of dye, and thus India's total demand for dyes can be supplied by 20 million tons of coal raised from its mines.

England, America, France and Japan have all during this war seriously taken up the question of putting their dye industry on a sound basis. Huge national concerns are being started in those countries, but India with her vast resources sits hand-folded. It is for the Indian Industrial Conference to draw the attention of the Indian Industrial Commission and of the Government of India to this important industry. The millowners in India may with a united voice urge upon the Government, in view of the great hardships that this war has entailed upon them, the urgent necessity of investigating the possibilities of this important industry in India.

Encouragement should be given to research work in this direction. Means should be devised to introduce improved ovens for converting coal into coke so that we may derive not only valuable coal-tar supplies as a by-product which at present goes to waste but also Ammonia liquor which can be of great use in the preparation of manures for agricultural purposes.

The present is the most favourable opportunity for this country to seriously tackle this important industry. Let us not be deterred by the idea that if we cannot at once start this industry on a huge scale entailing the outlay of crores of rupees, we have no chance of success. Alike in the best interests of the Government of this country, and the economic interests of the people, the question of producing coal-tar dyes in India deserves most serious consideration.

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# The Present Position of Indian Chemical Industries.

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India is proverbially known for its richness in raw materials, yet it is equally well-known that India has no industry worth the name. For one who bestows some attention on the subject, however, there is every little room for surprise. Most of the efforts that have been made so far have been haphazard, and nothing has been done either seriously or systematically. The ordinary laws of cause and effect and inter-dependence of industries have not been studied, and everything that has been undertaken is only meant for temporary profit. There is no view of the distant future and the foundations of a permanent structure have not been laid so far. The war has completely dispelled this lazy idea of the temporary success of certain Indian industries and clearly proved the complete dependence of our industries which were so long supposed to be firmly established. The consequence has been that whereas those that are already working our industries are at a loss to know how to keep them alive, others who can be credited with pious motives at the most (if not with any foresight in the subject) are glibly talking of starting new industries because of the war. Some there are who are going about giving responsible warnings as they call them, that if India does not take advantage of the war crisis and immediately launch into the industrial regeneration era, she is doomed to a permanent dependence on foreign countries. It sounds very well no doubt but how many have examined the practical difficulties and how many are there who have realised the meaning of their warnings? It is proposed therefore to examine the present situation with a view to examine (1) How far the war has affected our present industries (2) What industries are likely to live and what are likely to die away, if the war lasts for a few years more and (3) what would be the proper method of beginning chemical industries and with what limitations?

As soon as the war broke out, one very great fact was revealed and that was the dependence of India on foreign countries, particularly the enemy countries, for the supply of chemicals. Almost



all industries, great and small, have been disturbed and some industries are receiving a fatal shock. The sooner the war comes to an end the greater the possibility of their revival, the longer it continues, the greater is the likelihood of a total collapse. To take a few examples, take photography. This is not a great industry but it is merely a profession which depends upon Germany, Austria and Belgium for most of its raw materials. The prices of most of the chemicals have grown so fabulously high, that the photographers, unless they have a previous stock, will practically have to sublet their studios very soon. 'Hypo' for example cannot be bought to-day in large quantities. The price per lb has risen about 400 per cent. and even if a photographer were willing to pay the price, he cannot possibly get it in large quantities. This is not the case in India—alone—but even in England! Potassium Bromide was formerly Rs 1-8 per lb but to-day the price is Rs 12 lb. With such high rates for chemicals with a scarcity of papers and plates, the photographer cannot possibly keep the old prices and make a living. Moreover, every week the dealers receive weekly intimation from the manufacturing firms that they are forced to raise their prices by 50 per cent owing to their workmen being either engaged in munition work or having gone to the front on active service. To cite another example, let us examine the situation of match industry. One of the common chemicals used in this industry is potassium chlorate. The price of this substance, before the war, was four annas per lb. Today the price of the same has gone up to Rs. 2-4 per lb. Just imagine a factory that uses about 100 lbs per day. Whereas formerly the cost of potassium chlorate was Rs 25, now it would come to Rs 225—only on account of potassium chlorate. The sale prices are not changed owing to Japanese competition. Therefore the factory has to keep its old prices and make an extra profit of Rs. 200 per day. That would almost amount to a myth in any country. Take also glue. This is the binding material for the match heads. It is extracted from various sources—bones, leather, fish, etc. For the match industry, the only kind of useful glue is leather-glue. Its price before the war was annas 6 per lb. Today even for annas 12 per lb. the same quality of good leather-glue can not be had. What is available is only a mixture of bad glues—and that too for a much higher price than before. The manufacturer by paying a higher price and by using a bad glue makes bad matches and the reputation he has established after years of patient struggle in the face of an open, severe and unprotected competition is lost in a

week—and once he loses it, it takes him years to re-establish it and all this is due to no fault of his

Take, glass industry, the U P Government in its official reports has been complaining how the glass industry has severely suffered owing to the scarcity of colouring chemicals like Cobalt oxide. The price of this substance which was about annas 8 per lb has now gone up to Rs. 10 per lb and even then it is available in small quantities only. 'One' Porcelain factory making tiles of various colours is now, owing to the scarcity of the same oxides, forced to entirely shut up the department and make only red tiles. Once an industry is dismantled, it discourages the share-holders and all future enterprises get dumped.

Take, again, one of our established industries, the textile industry of Bombay. In spite of plenty of raw material, namely, cotton, at our disposal, the lack of a few chemicals have hampered the industry to such an extent that some of the mills in Bombay, Broach and Ahmedabad have already been closed and some are gradually closing. Bleaching powder, starch, magnesium chloride were some of the immediate difficulties. In Bangalore it appears bleaching powder could not be got to bleach yarn and one could not think of a cheap substitute. So in Bangalore people had to use unbleached yarn and the market would not accept the finished articles because they were not bleached. Magnesium chloride not only rose in price by 400 per cent but a stock of it could nowhere be had in India. This substance is used along with certain other chemicals to add weight to the finished cloth since the mills sell the cloth by weight. The lack of magnesium chloride was therefore a serious difficulty. I was consulted by one or two of my friends who are experts in the line as to whether calcium chloride could not be used as a substitute. The raw materials of starch we have enough and to spare and yet we are dependent upon Germany for this material. This substance amongst other things adds to the weight and finish of the cloth. So many examples could be multiplied to prove that almost every productive industry in India has suffered to a greater or smaller extent and if the war continues for some months more, the old stocks we hold in India will be sold away and buying of fresh stocks at the enhanced rates would be killing to our dealers and therefore we cannot even dream of it. Purely chemical industries like pharmaceutical preparations have suffered enormously, because they entirely depended upon Germany for their raw materials.

The medical profession has perhaps been one of the biggest sufferers as 'E Merck' of Darmstadt was to be found on every doctor's shelf. To make virtue of necessity, many doctors trained in western medicines have been gradually replacing western drugs by eastern Ayur Vedic medicines—and in many cases very successfully. Let us hope in this way at least our Indian drugs will be honestly tried by L M Ss and M Bs. Thymol, regarding the manufacture of which some experiments have been recently successfully tried in India, has gone up in price from Rs 4 per lb to Rs 18 per lb. Certain other important chemicals like potassium bichromate and potassium permanganate which were controlled by a German syndicate have risen from annas 4 or 5 per lb to about Rs 3 per lb. A Tanning factory which has established an all-India fame for its chrome-Tanned goods had to stop its Chrome Tanning department entirely owing to the scarcity and high price of chrome alum amongst other things.

The aniline dyes and their blockade has upset many of our industries. The dyeing of textiles, wool and silk, the manufacture of carpets, inks, boot polishes and the like have suffered immensely. The stock of aniline colours that we had in India is exhausted and no new supplies can be had till the war is over. A local mill had a stock of some old aniline dye stuffs worth about Rs 700. This quantity was sold away lately for Rs 3,500 and that too on condition that no guarantee could be given either of the correctness of the labels or of the purity of the samples! Nobody could have dreamt of such a bargain before the war. In Bombay, some of these old stocks were sold for 20 times the original prices. The textile industry in India has been perhaps one of the greatest sufferers. Dyers are being thrown out of employment and the mills being helpless are manufacturing only grey cloth. This is a serious matter, as already the cloth manufactured in India is of a rough quality, the prices of cotton though the export has suffered a good deal has been going higher and higher, and if coloured cloth could not be manufactured, the command of the market would be lost. Not long ago, I came across a circular issued by the educational department of this province inviting qualified students for a certain dyeing class at Sibpur. I do not know if that is an annual circular or the notice is being circulated only this year. If that is receiving special attention of Government this year, I am of opinion that this is just the wrong time for it. The dyestuffs cannot be had (unless

there be a stock at Sibpur of previous year) and dyers are being thrown out of employment. These two factors are enough to discourage any extra expenses on the school at the present time. Besides, if it is merely a question of teaching how to use the German dye stuffs and not how to manufacture them, it might be pointed out here that before the war every German aniline concern in Bombay used to train students in its private dye house, free of cost, only if the students promised to use the dye stuffs manufactured by a particular firm. Any expenses on a school for teaching the use of the dyestuffs would be in a sense a waste of public money, who-soever, does it. We shall see later on how far we can replace German dyes by Indian dyes of vegetable origin. So much about some of the general effects of war on our industries.

If we wish to re-organize our chemical industries, our attention is first claimed by the sulphuric acid industry. As a famous scientist has remarked: "If you tell me how much sulphuric acid is manufactured in a country, I shall tell you how far it is industrially advanced." Indeed sulphuric acid is the mother of all industries and its production is the starting point for most other industries. The manufactures of hydrochloric acid, nitric acid, sulphates of iron, copper, aluminium and magnesium, superphosphates of lime, phosphates of potassium and ammonium used for manures, potassium bichromate in the refining of metals, in electro-plating, aniline dyes, explosives and other industries all these require tons of sulphuric acid. We have in India hardly five or six concerns worth the name manufacturing sulphuric acid. D. Waldie's concern at Calcutta, the Eastern Chemical Company at Bombay (which, by the way, is merely a branch of an English firm of Manchester), the Pharmaceutical works of Dr. Ray deserve special mention. We have a small factory at Lahore which is worked on a small scale by a crude method. None of these factories can come up to the level of an average sized factory in Europe. Japan which has recently taken up the manufacture of sulphuric acid has 20 big factories to begin with and many of them produce 10 times the amount of acid produced in the biggest factory here. Already Japan-made sulphuric acid is crowding into the Bombay market. The price of the bulk acid produced for industrial purposes is as low as 2 pies per lb. in Japan, whereas in Bombay it is as much as 6 pies per lb. and the same in Lahore is worth 2 as per lb. In other words, in Lahore we are paying per lb. 12 times the price in Japan. Unless more up-to-date

methods are employed and more of competition is introduced, it is not possible to make any headway in the line.

With regard to the manufacture of this acid, there are some hazy ideas which need correction. There are many, who think that in the manufacture of sulphuric acid there are several bye-products and unless they are re-covered, it could not be manufactured cheap enough for competition. So long as the raw material is either sulphur or iron-pyrites, there is no bye-product, but if sulphides of zinc or lead are used, then the recovery of these metals becomes the main industry and the manufacture of sulphuric acid becomes a bye-product. The second mistaken idea is that the chamber process of the manufacture of sulphuric acid cannot compete with the contact process of the same. In a way it is true, but the chamber process has still some special advantages and India with the chamber process can long stand the foreign competition. As it is, the contact process is not yet common, it being mostly used only in Germany. On the banks of the Rhine, a number of German concerns are manufacturing tons of sulphuric acid annually by the platinum contact process. In the year 1904, the firm of Badische Aniline Co. alone manufactured 200,000 tons of sulphuric acid by this process. The firms of Meister Lucius and Actie-Gesellschaft furzinc Industrie have at least 30 factories for the manufacture of this acid by the contact process. The secrets of the industry have not yet travelled beyond the Rhine—no, not even from one factory to the neighbouring one, each factory having its own secrets. Though experts pronounced that the chamber process is a 'threatened industry,' it will yet linger on for some time, more particularly in India, because though the acid is made cheap in Germany, the cost of transit is very high, sulphuric acid being looked upon as a dangerous companion to the ship. The chamber process, as it is worked in India, needs immediate reform and attention and by making it up-to-date, it is possible to hold out against the contact process for many years more. A co-operation of sulphuric acid manufacturers all over India might lead to an immediate solution of the problem.

Once the manufacture of sulphuric acid is commenced, so many industries, depending upon it, can be taken in hand. For example, the manufacture of super-phosphates of lime manufactured out of bones and sulphuric acid and used for manures can easily be undertaken and a cheap superphosphate is a welcome necessity for India,

Bones we are exporting from India worth more than a crore of rupees and if looked at from the scientific point of view, we are exporting so much of the fertility of the soil annually. Our lands are getting poorer and poorer every-day, foreign manures are very expensive and whereas in foreign countries manures are being freely used by a rich peasantry, in India the case is just the reverse India is an agricultural country and the lands have a limit to their fertility. The constant export of corn is a perpetual drain on India's lands and their fertility and there is no reason why our Agricultural Departments instead of recommending foreign manure should not start cheap manure works in India and enlighten the people of India on the use of these manures. This would be of the highest good both to the Government and to the public. Indian lands will then present a smiling look and the peasantry will be much happier than it is now. It is not possible here to mention the details of all the industries that could be taken up, if cheap sulphuric acid is manufactured in India.

Next to sulphuric acid comes the manufacture of alkalies, as soda carbonate, soda bicarbonate, caustic soda and caustic potash, ammonia, ammonium chloride, ammonium sulphate, etc. In the manufacture of soap, glass, paper, in dyeing, mercerizing, bleaching, sizing, finishing, for household washing purposes and a number of other industries, these are consumed in large quantities. The textile industry is one of the biggest consumers of the alkalies of all sorts. Formerly India used to manufacture these alkalies from the efflorescence found in various soils, as, for instance, in the Punjab, Nizam's dominions, Mysore, etc. Even to this day, in the Punjab and North Western Provinces, this sort of alkali is being used for the manufacture of cheap soaps. Owing to the introduction of cheap alkalies from foreign countries, the crude method of Indian origin cannot possibly hold out any longer. It is, indeed, a great pity that India should not have up till now started a single alkali factory. Mr. G. N. Potdar of Bombay is doing something in the line in his Pioneer Alkali works, where he practically recrystallizes soda carbonate from soda ash, which he imports from England. Of course, this is no difficult task, yet it only shows the great possibility of the success of this industry. Still another concern in Bombay is trying to manufacture ammonium salts from the *gas liquor* of the gas works at Parel near Bombay. Partly on account of lack of Capital and partly on account of certain technical difficulties, such as the sublimation of ammonium chloride, the concern has

not yet made any headway. I have personally seen the ammonium chloride and ammonium sulphate made by this company and it is quite a good experiment

There are three processes for the manufacture of soda carbonate, (1) Le Blanc's process, (2) ammonia process and (3) upto-date and modern electrolytic process. The second and third would be best suited for Indian condition. Ammonia process is both easy and simple and avoids a number of complications of the Le-Blanc's process which gives rise to a number of bye-products, and it could be made successful. The electrolytic method, on account of the cheap electric current which is made available by Tata's scheme could also be undertaken with no great risk. No doubt this would mean expert knowledge but it should be remembered that the electrolytic process is coming in, in almost every industry and with cheap current, it seems all the old methods will gradually die out. It is necessary, therefore, that as far as possible upto-date methods should be employed, if any new concerns are to be started successfully and if they are to stand foreign competition. With cheap alkalies, soap, glass and various other industries could be easily taken up.

The manufacture of chlorine (for bleaching purposes) and potassium chlorate are both important industries as these two commodities command a great market. Chlorine was formerly manufactured by heating a mixture of pyrolusite (manganese dioxide) and hydrochloric acid, but now the electrolytic method has made its manufacture immensely cheap. At present, the electrolysis of common salt is used for the manufacture of chlorine and in Bombay both salt and the electric current can be had very cheap. Bleaching powder requires chlorine and lime powder and both these can be had in India for nominal rates. Not only can we manufacture for ourselves all the bleaching powder we require, but there is every chance of our successfully exporting it out of India, provided up-to-date methods are used. Potassium chlorate was and is yet manufactured in many places by taking advantage of the difference in solubility of calcium chlorate and potassium chloride, whereby the less soluble potassium chlorate settles down first. But even in this manufacture, the electric method is ousting the old one. The disastrous effect of the rise in prices of potassium chlorate from As 4 per lb to Rs 2 4 as per lb on match industry has been already mentioned. I know for certain that some successful match factories are already closed and others are struggling.

The manufacture of potassium bichromate and permanganate of potassium cyanide used for gold refining, potassium ferro-cyanide and ferri-cyanide all demand attention. In this connection, it might be pointed out that Germany has a natural advantage over other countries. At Stassfurt there are the natural deposits of salt beds and all potassium salts are derived from them. Some of these chlorides and bromides are very likely being used by Germany in these war days for the manufacture of chlorine and bromine which are being so freely used as asphyxiating gases.

We shall next pass to organic substances such as starch, artificial camphor, rubber etc.

Beginning with organic substances, starch is one of the substances that attracts our attention. We have an abundance of raw materials for the various starches, such as rice starch, maize starch, wheat starch, potato starch, etc. There is plenty of land already under cultivation for these substances and much more could be had if need be. The wonder of it is as in most other industries, every pound of starch we have to import from outside. A grinding mill for finely pulverising the raw materials, a crushing machine, large wooden vats for steeping purposes, boiling arrangements, large drying rooms and plenty of pure water is all that is needed for this industry. With sufficiently large capital, this has every chance of being a successful industry. The consumers of starch are very largely the Indian cloth mills and hence there is no difficulty of a market.

Coming now to artificial substances we enter into the romance of modern achievements of science. Before entering into the list of the artificial substances, I want to draw your attention to one point, namely, the difference between *artificial* and *imitation*. Artificial silk, artificial rubies, or artificial diamonds would all be quite different from 'imitation' ones, artificial would mean possessing all the chemical and physical properties of the natural, but prepared by man in imitation of nature—perhaps—and on a commercial scale, imitation would mean only "looking like" but not being chemically the same as the natural substance. There are many who confuse 'imitation' with 'artificial' and that makes a world of difference. Artificial camphor, artificial silk and artificial perfumes are some of the modern achievements of science. Some of these artificial substances have been awfully cheap—for instance—



artificial rubies (not cut into a crystalline form) are sold at the rate of nearly 6 annas per lb. Very recently the association of Bremen Chemists announced that artificial cellulose (paper-substances) has been successfully prepared in Germany! What an achievement this would be, looking to its great importance in the manufacture of explosives like gun-cotton. With nitrates manufactured from atmospheric nitrogen and cellulose artificially prepared, Germany would be preparing explosives in huge quantities and she would be quite independent of the import of cotton and paper material from the outside world. The natural perfumes and scents of France are a threatened industry ever since the development of artificial perfumes from coal-tar bye-products in Germany! India has got a very large margin for producing the natural substances rather than the artificial, it would be (judging from present conditions) a Herculean task for her to produce the artificial substances on a commercial scale.

Coming now to coal-tar colours, human achievements have beaten nature hollow! The variety of colours and the variety of shades produced with wonderfully scientific accuracy are not to be found *even in nature*! There has been a great talk recently in India on the subject of these artificial colours, because the prices of many of these colours have, in some cases, risen by 2,000 per cent. There is also a talk about reviving Indian vegetable dyes—but in my opinion this is all idle talk. It is like beginning to dig a well when one feels very thirsty. Vegetable colours do not seem to have any chance of success over coal-tar colours and in India there is no chance whatsoever for the coal-tar-colours until and unless the distillation of coal becomes a common industry as in Germany. In a recently published book known as "Industrial Germany" we find how municipalities and the Government in Germany have combined to produce cheap coal gas for house-hold use and sell the coal-tar for a nominal price to colour works. The profits derived from this industry by Germany have been huge, the smallest of these colour-works having employed as many as 200 Ph. Ds out of the *profits* of the business for research-work alone. The wonder of it is that all primitive researches in colour industry have been made by English chemists and German fore-sight has so organized the whole industry, that it has got the lion's share. Even in England to-day, the best of research chemists are unwilling to start any colour-works until and unless the State

guarantees protection in various ways. It must be remembered that coal is both cheap and of a high quality in England—whereas in India it is neither. If English chemists find themselves in such a helpless plight to-day, India should take up this industry last—after she has tried all others. The supremacy of Germans in this industry has been due to two causes, (1) an army of University trained chemists and the unlimited amount of money spent upon research work and (2) the laxity of British patent-laws. The Germans have successfully filled a number of blocking patents in England, thus preventing competition and some of these patents, it is now discovered, are *dummy patents* never meant for actual working but all meant for misleading.

The following table would be very instructive in this connection.

Patents taken out in Great Britain by British and German individuals or firms for Synthetic dyes and Intermediate products, (in five year periods) —

Period	German	British.
1856-60	8	20
1860-65	21	54
1866-70	17	23
1871-75	8	11
1876-80	47	13
1881-85	113	15
1886-90	201	39
1891-95	386	29
1896-1900	427	52
1901-05	447	38
1906-10	561	30
1911-12	252	11

Let me now pass on to two important industries, soap and candle making. We have now some very successful concerns for soap-making in different parts of India and Indian soap is making a good name. The raw material is mainly fatty oils. In spite of a few successful concerns in India, there is any amount of different types of foreign soap sold in the Indian market. Foreign soaps are both cheap and better and naturally the question arises, how is it that the foreign soaps are so cheap when they export oils from India and then manufacture soap out of it? My answer to this question

is that here again we are doing things not with intelligence but by the rule of thumb. In the first place, animal fat is freely mixed with oils in foreign countries and in India, fat is subjected to a religious boy-cott. Secondly, by hydrolysis, the oils are first decomposed into fatty acids and the glycerine is separated and sold at the rate of 12 annas per lb. In India, this glycerine is not separated at all but is mixed with the soap. The fatty acids are further separated into solid acids (like stearic and palmitic which are sold to candle manufacturers) and liquid acids like oleic acid (which is used for soap making). Generally the oils sell in the market from 2 to 3 annas per lb, all oils contain about 8 per cent of glycerine which is sold at annas 12 per lb, the oils also contain 40 to 60 per cent of stearine which is sold to candle manufacturers at 5 annas per lb. It is liquid olein which is used for soap-making and hence it is that foreign soaps are sold dirt cheap in the Indian market. I do not think there is a single factory in India which is recovering glycerine. Indeed, there was a time when glycerine was a waste bye-product and soap was the main item of profit, to-day glycerine has been such an important constituent of explosives that soap is looked upon as a bye-product.

Recently oleic acid is being converted into stearic acid by a process of hydrogenation. The formula for oleic acid is  $C_{18}H_{34}O_2$  and that for stearic acid is  $C_{18}H_{36}O_2$ . So that with two atoms of hydrogen, oleic acid is converted into stearic acid. By weight 282 pounds of oleic acid require 2 lbs (or about 0.7 per cent) of hydrogen for the production of 284 lbs of stearic acid. 1000 Cu ft of hydrogen weigh approximately 5.6 pounds and therefore per ton of olein, approximately 2500 Cu ft of hydrogen are required. This change is brought about easily in the presence of catalytic agents of which Nickel is the most important. With a cheap supply of Nickel and hydrogen not only oleic but many liquid oils can be solidified. The value of many useless oils has been enhanced by this process.

In my last article, I indicated the almost insuperable difficulties that exist in competing with German colours. I also dealt with the facilities we possess for the manufacture of starch, soap and candle. Candle industry in India should succeed well—with a little modification. As it is, Burma has been the centre of candle trade since paraffin is available there (as a bye-product of petroleum indus-

try) both cheap and in abundance. The only defect in these candles is that they bend and melt in hot climates. With a certain amount of stearine added cautiously, this defect can easily be removed—and stearine has been an article of great expense in these war days. At Billimoria, (in Baroda State), I understand, a stearine factory is being started, but there has been some delay owing to lack of capital. This would perhaps be looked upon as the first scientific effort in this direction and it is hoped the concern will soon make a beginning, since oil, the only raw material needed, is so cheap in India.

We next pass on to varnish and paint manufacture. Here again we have a vast field. The best drying oils such as linseed oil, hemp oil, poppy seed, sun-flower oil, etc., and a number of semi-drying oils such as sesame oil, rape-seed oil, castor oil, mustard oil, and a number of gums and resins are available, but we have done very little or nothing in this line. An industry allied to this, is printing inks, and there is a factory in Calcutta (managed by an expert, Mr. J O Bose) which I believe is doing well.

The trade in essential oils has got good prospects in India. Rose grass oil, lemon grass oil, sandalwood oil, citronella oil, are all manufactured by some crude method, exported and re-imported in a refined and attractive form. Recently, the Government of Mysore tried to extract sandalwood oil, and is now manufacturing the oil on a commercial scale. All these essential oils have a great field, yet it must be noted, a number of German made artificial oils are also coming into the field. In India, recently, we have had a new class of so-called perfume and hair oil manufacturers, but it must be borne in mind that they deserve credit merely for their *compounding*. They buy a number of perfumes, all foreign, and mix them in different proportions and the so-called hair oils have all got *white oil*—a refined product of petroleum which is scented artificially by mixing some cheap German perfume.

Coming now to sugar industry, we are not faring very well even here. In the first place, Austria and Japan have by a regular system of bounty-giving, succeeded in capturing the Indian market. Except in the Punjab and the United Provinces, the land under cultivation of sugar-cane is going down and but for the fact that there is no sea-port near the Punjab and also because the consumers are articular about 'desi sugar,' even here, the industry would have suffered. According to modern ideas, the industry can be successful

with a central factory system, where up-to-date machinery is employed. This means, either one zamindar must own a number of square miles in one place, or otherwise, a certain number of landowners must be compelled to grow sugarcane in a certain area. Another and perhaps a more important consideration is the main by product, namely, molasses. It must be fermented and rum manufactured out of it. The factory at Sujampur in Gurdaspur district has been, I am told, working at a profit ever since it has been allowed to make rum and carbon dioxide out of the molasses. I think there is some legal restriction on the manufacture of rum and this has stood in the way of many small factories which have to make all their profits only by selling the sugar, whereas outside India, the rum fetches a good price. Bearing in mind that India is a country of *small landowners*, unless this permission of utilising molasses is granted to one and all, I am afraid, sugar industry of our country has no bright future. Up-to-date machinery or crushing sugar-cane is of course a necessity.

Let us next consider the case of leather tanning in India. There is a tremendous field in India for this industry, since we are annually exporting about 15 crores of rupees worth of raw hides and skins. Leaders of the Depressed Classes Mission in India might well take up this problem, as this industry really belongs to the lower classes. At the present day, by educating the lower classes, there is only created a greater struggle than before for *clerkships*, but by teaching this profession to them, they will not only improve our economic condition, but will also be creating a better feeling between the lower and higher classes. There are several factories in Madras, Bangalore, Baroda, Bombay, Agra, Cawnpore, Delhi, Calcutta, Lahore and other places in India and at the present time, there is a very great demand for Indian buff leather for military purposes (boots, belts, etc.)

An industry quite allied to this is the preparation of tannin extracts. We are every year exporting several lakhs worth of tanning materials. But if the tannins are extracted in India and then exported, it will be cheaper for the consumers on the continent and yet it would be a new industry to India. As it is, since the tannins are not extracted, freight charges are being paid for both the useful and the useless stuff. There are several students who had gone to Europe for learning this industry, but I am not aware of any factory being started for the manufacture of tannin extracts.

Lastly, let us consider the manufacture of pharmaceutical preparations. With sulphuric acid made in India, these preparations could be made entirely in India. Otherwise, with imported chemicals and with the help of some recognised pharmacopœia, a large industry can be made to flourish in India. The Bengal Chemical and Pharmaceutical Works of Calcutta is a highly laudable effort in the right direction, because here an attempt is being made to make all drugs out of *completely Indian* raw material. This will have another remarkable effect and that is the healthy revival of the Ayurvedic medicine. Prof. Gujjar's 'Alembic Chemical Works' is conducted on lines of less originality and risk, because the chemicals are all imported and only compounding is done in India. Several workers with previous experience in the Alembic Chemical Works have started new concerns in Bombay and are doing fairly well. At Sholapur there is an "Ayurvedic Pharmacy" where purely Indian drugs, *Bhasmas* and *Matras*—are prepared according to the directions given in our ancient books on medicine and this is undoubtedly a praiseworthy effort. We want several more concerns of this type in the country, where modern methods of refining are employed to prepare drugs of established reputation. In India, the vegetable kingdom is unexplored and several alkaloids, such as strychnia, quinine, morphine, brucine, etc., could be manufactured, but all these require original enterprise and an amount of experimenting, which will be expensive in the beginning, but will ultimately pay.

This brief survey of our chemical industries is not at all encouraging. A certain member of the Bengal Legislative Council once compared the Indian Industries to a graveyard, where there are several old and crumbling graves and new graves are being dug for the burial of decaying ones. The causes for this deplorable condition are many—and the inquiry can only be undertaken quite independently.

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# The Value of Research.

By Dr. Harishchandra, Ph D (Berlin)

Director of the Techno-Chemical Research Laboratory, Debra Dun

—————:0:—————

" No scientific discovery can with any justice be considered as  
due to accident —" *Gore* "

The present war has awakened India to the necessity of meeting her own requirements. She has fully realised how far science and its constant and well-directed application to manifold arts and industries has helped the Western countries. They have reached the present stage of advancement by patient research into (1) particular industries suggested by the occurrence of an abundant supply of certain raw materials in nature or (2) into such industries as were necessitated by large demand of certain articles, the raw materials of which were absent in the country. Soda is an example of the former and artificial Indigo of the latter.

It is a well known fact, that the productive power of land in Europe especially in colder regions is very poor. Liebig and his successors set themselves to find out its cause by analysis of the soil and succeeded in enriching it by eliminating the harmful and adding the useful ingredients. Sugar is an article of every day consumption but it could not be produced in Europe for want of sugarcane. After several unsuccessful attempts to cultivate sugarcane for which its climate is not suitable, Margraff in 1747 discovered beetroot as a possible substitute, but the percentage of sugar in beetroot being much lower than in sugarcane, Margraff's successors set about improving the cultivation of beet root and by scientific means increased the percentage of sugar in it to an amount almost equal to that of sugarcane. Further the bye-products were utilised in making alcohol, aldehyde, ether, paper pulp, red colour and manures etc. The result was that Germany gave a severe blow to the Indian Sugar Industry.

## *The Industrial development of India*

"Whoever could make two grains of corn, or two blades of grass,  
to grow upon a spot where only one grew before, would do more  
essential service to his country than the whole race  
of politicians put together" — *Swift*

The development of Chemical Industries in India has since long been looked upon as an important problem, but it was not until the

great catastrophe of the present European War, which cut off some of the most important trade communications, and almost completely stopped the importation of the most urgently needed chemical products, that our people have begun to realise the situation and come to recognise how helpless they are in this matter. Both, the Government and the people have set about thinking as to what must be done, and done immediately to remedy such an unfortunate and deplorable state of affairs. The Government of India in the Industries and Commerce Department have already begun to move in the matter. "Out of evil cometh good" says a proverb and let us hope that this terrible war would bring about the Industrial Regeneration of our country.

An examination of the annual imports and exports of different articles will show, how far for our daily wants we are dependent on the European manufacturers and to what extent they are dependent on Indian raw material. This will at once set an imaginative mind to think what, under the circumstances, may be achieved with the help of **Science and Industry**, if only we have the will and prudence to make our capital yield and multiply.

Of all the varieties of goods imported, according to "The Commerce" dated 2nd September 1914, Germany has supplied to India nearly seven times as much as Britain. Confining our attention only to Chemical products, we import annually 1,54,500 tons valued at Rs. 4,40,98,836, which are the finished products of 1,53,601 tons of Raw materials worth Rs 2,45.15,944 exported from this country every year. The stoppage of this competition owing to the war, has given us now an excellent chance to start and develop new industries and derive immense benefit thereby. Let us not allow this opportunity to slip through.

The present condition of Chemical industries in India is confined to a few preliminary simple operations like evaporation, distillation, extraction and crystallization, etc. There are a few factories, in which scents and some pharmaceutical preparations are made, but on account of the difficulty and cost of getting some of the ingredients from Europe, these preparations cannot be made as cheap as the imported articles, and there is consequently a great temptation to obtain the articles, ready-made from Europe and after some manipulation to pass them off as country-made. This leads to moral degeneration of the worst type in men of light and leading



and saps the foundation of all enterprise. Fraud, both in the form of adulteration of pure products and the dishonest means often adopted by the managing hands, has resulted not only in totally ruining the works and demoralising the people, but has also played such a great havoc that it has become difficult to induce capitalists to finance technical industries. Some works have also, no doubt, failed on account of the want of proper skill on the part of the expert. But cases are not wanting where factories have been started, when even the essential preliminary calculations of the processes involved, would have shown that the concern was a losing one.

Another fact that makes the country-made articles expensive is, that the machinery and often even the experts have to be imported from Europe. The processes of manufacture and the requisite machinery in vogue in Europe, have been evolved after considerable experience, to meet the wants and climate of Europe and when imported into this country stand in need of alterations, some parts of the machinery being found totally unnecessary and others that are necessary for the Indian raw material and climate are found wholly wanting or require considerable modification. These circumstances have often proved great barriers in the way of the industrial development of India.

It is therefore obvious, that we must start manufacturing the fundamental products from Indigenous raw material and as far as possible from Indian made machinery. This will not be difficult in case of most chemical industries. Such parts of machinery as cannot be made in India, can be ordered from Europe. A model of the intended plant can first be made, if necessary, and after experimenting with indigenous raw material in it, suitable alterations should be carried out till the model is perfected. Apart from economy, the educative effect of this attempt will be immense and will give confidence to the workers, who must, of course be men of the right stamp to push such undertakings to success.

### *The Value of Scientific and Industrial Research*

“The Pseudo-Chemist seeks Gold, but the true Philosophers Science,  
which is more precious than any gold.”

Chemistry is essentially an experimental Science and it must, as in the past, justify its existence on the grounds of general utility and not of theory only. The craving for industry has led the

investigator to science, yet the former has to thank for its existence the latter. Facts of merely theoretical interest are by no means to be under-valued, as existence of new elements has sometimes been discovered along with their properties, which have been subsequently verified on the discovery of those elements, *e g*, that of Germanium by Mendeljeff. Very often facts of theoretical interest have also proved of practical value. Development of the Mond nickel process from the original investigations of carbonyls is an example to show what things of mere theoretical interest may lead to at the end. Metallographic study of alloys and metals has brought about a regeneration in the metallic world. Auer von Welsbach's work on rare earths has given rise to incandescent light industry to which all the night festivities of the world have to thank. The present development of gold industry of Transvaal has been possible only through the investigations conducted on the action of cyanides on metallic gold. Equally important developments in the textile industry have followed the study of the action of caustic soda on cellulose under varying conditions of strain.

"He that will not apply new remedies must expect new evils,  
they that reverence too much old things are but a scorn  
to the new" *Francis Bacon*.

The utility of Industrial research is well known to intelligent capitalists, who have always been pioneers of the industries of their times. Instances are not wanting to prove the importance of Industrial research. Early experimentations on the fixation of atmospheric nitrogen have resulted in supplying the world with cheap nitric acid, ammonia, nitrates, cyanides, etc., artificial silk has already supplied the markets with a cheap and efficient substitute for real silk, synthetical indigo and alizarine industries have reached a stage of tremendous activity in the commercial world and so on.

It is advantageous to carry out investigation work even in the known regions. The manufacture of hydrogen for commercial purposes is a case in point. Its preparation by the action of acid on zinc has no longer any special interest. During the recent war, this gas is said to have been prepared for Balloon purposes by the action of concentrated caustic soda on aluminium shavings. Another process, which has great possibility and has already been made use of, is the decomposition of calcium hydride. Frank proposed a method of passing water gas over calcium carbide with subsequent removal of oxides of carbon. The electrolytic method is in general use at present.

but the action of steam on iron filings is said to have a great future before it, specially when the resulting oxide is subsequently reduced by means of water gas etc and the process made a continuous one. Modern chemical engineering deserves the credit to a great extent for this success. The work done at Mansfield in Germany in the direction of treatment of copper ores may also be taken as a typical one. Augustine, some sixty years ago, found that when finely crushed copper mattes were leached with sodium chloride, the silver present was converted into chloride and that this could be removed by solution in hot brine. Ziervogel, subsequently found, that by careful washing coupled with heating, the silver could be converted into silver sulphate which could then be washed out and recovered by precipitation on copper by the Augustine process. This process met with a great success in Colorado, where until then silver was wasted in the undetected form. By this process 2,770 tons of silver sulphate are recovered to-day at Argo alone. Another recent introduction at Mansfield, which also owes its success to the Industrial chemist, is the production of sulphuric acid from the converted gases produced in smelting the copper ore. In America, the Tennessee Copper Co are making 200,000 tons of acid per annum from the waste sulphur by this process, while the Washoe Works of the Anaconda Co, still discharge enough sulphur in the air to make 1,400,000 tons of acid per annum. Again in the extraction of gold by the cyanide process, which is of course, the latest one, a saving of a penny per pound in the price of cyanide meant a further reduction in the working expenses of £ 70,000 in the Johannesburg district alone. The original manufacture of calcium carbide has in its turn led to the production of cyanamides, which, apart from their value as fertilizers, in their turn have given rise to the manufacture of ammonia, nitric acid, and cyanides etc, on an industrial scale. The oxidation of naphthalene into phthalic acid, which has played so large a part in the manufacture of artificial indigo, is also by no means to be forgotten.

All such investigations take much time and demand great perseverance. The preliminary work connected with the production of artificial indigo is said to have cost over a million pounds sterling.

The importance attached to the research work and the money spent over it in European countries can be judged by the fact, that a

certain business combination in Germany employs no less than seven hundred chemists

The enterprise of Tata and the amount spent by him, in the preliminary investigation of iron ore should inspire the capitalists in this country to persevere in pushing the Scientific and industrial Investigations to a successful end in the cause of their motherland.

*List of important raw materials and corresponding Industries*

RAW MATERIALS.	INDUSTRIES.
	<i>Inorganic.</i>
PYRITES OR SULPHUR.	Sulphuric acid and bye-products.
SALT, NITRE, SALTPETRE, LIME, CHARCOAL AND SULPHURIC ACID	Hydrochloric acid, nitric acid, salt cake, chlorine and its compounds, <i>i. e.</i> chlo- rides and bleaching agents etc, soda, soda-bicarb, caustic soda, caustic potash, etc
PHOSPHORITES, BONES AND SULPHURIC ACID	Artificial manures, as bone dust, super- phosphates and ammonium sulphate; bone fats, pyridine, picoline, lutidine, etc
METALLIC OXIDES AND ORES	Metals and their salts
	<i>Organic</i>
SEEDS & ANIMAL FATS ETC.	Oils and fats.
SPICES AND FLOWERS.	Essential oils, perfumes etc.
GRAINS	Starches, dextrine, glucose, gluten etc.
SUGARCANE	Cane-sugar, alcohol and alcoholic drinks, acetic acid and cellulose.
SAW DUST.	Methyl alcohol and acetic acid.
RAGS AND GRASSES	Mechanical pulp and paper
COAL	Coal gas, ammonia and its compounds, coaltar and its products too nume- rous to be mentioned here, as the number goes above eighty lacs.

*The Utilisation of Waste products.*

"Dirt is merely matter in wrong place"

Apart from the principal product, there is also the question of utilising the manifold bye-products of a manufacture. Great attention has always been paid to this in all important manufactures in Europe, and that has been the main reason of the commercial success of her industries.

Of late "The utilisation of waste products" has gained so much importance, that it has become a science by itself. The most fantastic tale, that ever appeared in the Arabian Nights, is not more wonderful than the feats performed with the waste materials by the modern Engineer and the Industrial Chemist. To them a dung heap is a kind of gold mine. Without any prejudice it must be admitted, that they have fully demonstrated the truth of Lord Palmerstone's saying, that "Dirt is merely matter in wrong place". The increase in the population of various countries and especially in that of great cities has been one of the reasons why the genius of the inventor has been stimulated to contrive methods, to make what was called "waste" of worth, by using it in various compounds and articles, which have already become indispensable. The things that are thrown into the streets, house yards and dust-bins as rubbish can be used in so many ways, that scarcely anything can now be considered as refuse. To give a few instances, old tin cans, cases and clippings are melted to be moulded into fancy buttons and toys for children, which sell throughout the world. Discarded shoes and pieces of rubber have become useful in manufacturing various substances. Not a single broken bottle or other piece of glass need be thrown away, for when crushed and mixed with the sweepings of street pavements, and certain kinds of earth and sand, it makes an excellent artificial stone for building purposes. Old rotten rags and pieces of cloth are bleached and turned into best white note paper. Usually perfumes and scents are considered as being obtained principally from flowers. All the toilet preparations and even confectionery are now manufactured and flavoured with numerous products extracted from coaltar, which is a refuse of gas making plants, such as are to be found in every large city. Beautiful colours of different shades, too well-known to be mentioned here, are the results of scientific labour on the same nasty substance. Saw dust thrown away as mere waste is used to sprinkle on the

floors of cafes and butchers' shops, where it prevents the dirt from sticking to the floor, and cemented with the hydrated oxide of magnesium, it is used for making excellent flooring tiles, which are light and durable. Moreover 220 lbs of this stuff when distilled, yield 2 gallons of fine alcohol, with a series of important bye-products. It is a fact that there are no less than 500 saw dust merchants in the city of New York alone, where they sell, what is generally called "waste" to the value of £ 400,000 every year. The slaughter house bye-products are too numerous to be mentioned here. Bones are converted into artificial manures and animal charcoal etc., and the very last drop of blood is made use of in making albumen and the like. Why, even the night soil and urine are made the source of so many useful compounds used in agriculture and medicine.

### *The Importance of Analysis for Manufacturers and Businessmen.*

"Analysis is a check to a manufactory as accounts are to a business"

Who is not tempted to buy at least a few of the many useful and nice looking articles, which are imported into this country in such large quantities? Many endeavour to take hints from different sources and try to make them for themselves, but often their efforts are not crowned with success. The failure in many cases is due to ignorance of the proper ingredients and the proportion in which they are present to produce the desired stuff. Complete Analysis generally removes this difficulty and even sometimes suggests the exact process of manufacture. The usefulness of Chemical Laboratories is fully reconized in the West and people in different walks of life consult them to advance in their own trades and professions. Foremost of these are those manufacturers, who have already profited by following the routes opened by scientific investigations and are particular about the quality and quantity of their outturn, so as to stand boldly in face of the keen competition of their rival manufacturers. Petty manufacturers also take advantage of scientific experiments and get their products regularly analysed with a view to profit by suggestions that may strike them and improve the yield either in quality or quantity. Businessmen are quite as particular about the analysis of the articles in which they deal, in order to ascertain the exact percentage of their useful ingredients and to fix proper rates on them. Many excel in their trade by contriving some means of removing the objectionable features and thereby attracting more customers. Even a farmer would not be content and arrive at

his conclusions at the time of sowing the seed, merely by considering the demand and depending upon his fate, but would insist on knowing, what particular crop could most profitably be produced in his soil, by actual analysis of the different elements, such as soil, seed, manures, water, etc

### *Consultation and Advice*

"Zeal without knowledge is like expedition in the dark "

There are very few admirers of science, who would pay for consultation merely out of theoretical interest, in spite of the known fact that all practical work is based entirely on theory. Such researches are always carried out by the Devotees of Science, who are scientists themselves and very often spend their whole life, in adding one link more to the chain of knowledge of the world and hand down results of immense practical importance to their successors. Millions have been spent on researches, which were entirely done at the expense of the investigators themselves, nearly all of whom were men of limited means. Consultation, therefore is merely sought for the industrial problems, which the capitalists cannot solve themselves. It becomes an extremely difficult and risky affair to give any advice offhand on industrial problems, which invariably require a thorough examination of the raw materials under consideration, their full history, as far as possible, with the conditions under which they are to be worked. Even with this data, it is not always possible to say without conducting a few laboratory experiments, whether it would be worth while to undergo the investigation expenses, to say nothing of establishing a factory, for which detailed experiments will be necessary to prove either its practicability or the present impossibility.

Experiments on a large scale have ruined India and it is sincerely advised that they should be undertaken on a laboratory scale. Unfortunately, the behaviour of experts in this country has not been very satisfactory and the enterprising capitalists are warned not to mind the comparatively insignificant expenses they will have to incur, to get the samples of the products under contemplation, prepared and satisfy themselves as to their quality and market demand, before launching upon any industrial scheme.

The solution of problems on the lines indicated above, always requires a certain amount of Scientific Research work, which has to be reduced to the technical scale in Laboratory, before any Samples of finished products could be sent out for approval. It is

obvious, that this kind of work cannot be done merely by the aid of books, as their compilers, as a rule, have not the same object in view as the investigator. Research has been well defined as "Passing from the Known to the Unknown". This presumes a full knowledge of all that has been done in connection with the problem in hand, to avoid unnecessary labour and expense in rediscovering what is already known and to enable the investigator, who in addition to possessing an up-to-date knowledge of his subject, as Gore says, "must be able to imagine, invent, manipulate, observe, compare and reason" to hit on the easiest and the most direct way to success.

The investigator must never be discouraged by the time required to obtain experience and confidence. If no success is attained, the capitalist must console himself with the idea that "Money saved is money gained". The investigator, remembering Faraday's words that "It required 20 years of work to make a man in physical science the previous period being one of infancy" and from his personal experience that "Every fact and every discovery casts a light beyond itself and the extent to which this light is perceived depends upon the man" should be inspired with curiosity and new vigour to tackle his problem again. Thus it would have been sufficiently clear that the people desirous of solving problems will be helping their own cause by giving to the Chemist all the possible detailed information regarding the subject.

It remains, however, for the investigator to get the problems for solution from the enterpriser in such a systematic way, as to lessen the time, labour and expenses required for a successful issue. For this purpose the following procedure is recommended.

On the discovery of a certain raw material, the first point of importance is to know its nature to fix the value. The nature can be ascertained by qualitative analysis and the value fixed by quantitative analysis. Technical analysis is necessary to ascertain whether the raw material under consideration has any industrial value and if so, what are likely to be the main products and the byproducts. If the reports are favourable, the next step is to find out the approximate quantity in which the raw material is available. In case of minerals, prospecting will be necessary, and to mark the progress and direct the methods, casual analysis will be required. When it has been found that suitable raw material exists in a sufficiently large quantity to give rise to a particular industry, the problem gains a Commercial



importance, and the Industrial Investigation work is desirable. At this moment, it is essential for the investigator to visit the station in person to study carefully all the local conditions to hit on the right processes of manufacture. The Samples of the likely Products and the Bye-products may then be demanded from the investigator and on their approval in the market, the enterpriser may ask for full estimates, plans and detailed drawings of the machinery required to turn out a certain quantity of the product per month, and a full report for the establishment of the proposed factory. At the time of the erection of the works, the constructing engineer will have to be guided by the Chemist in material as well as in the way of construction, so as to avoid any mistake from a Chemical point of view. On completion of the works, the investigator may be given charge of the works, or he may remain as a chemical adviser, if the process be bought by the capitalist after settling terms. But the enterpriser should bear in mind that he may have some difficulty in doing away with the chemical adviser, whose consultation is often necessary to remove the every day practical difficulties, unless the capitalist himself be a persevering scientist.

A manufacturer, who is anxious to get any suggestion that may help him either to increase or better his product will do well to send samples of all the raw materials and chemicals he makes use of with that of the finished product, bye-products and the intermediary products for examination, accompanied with a full explanation of what he wants. If the quality of the product has to be improved upon with a view to compete with some other make, he should also supply those samples for comparison. He should not hesitate in laying his methods of working before the investigator, like a patient who reveals his secrets to a medical man, who comes to treat him. It is mere faith that brings the manufacturer to an investigator in connection with a certain problem, as, like a patient, the former does not know whether the doctor will be able to do him any good. In the event of failure, the manufacturer should know that the evidence of a negative character is almost as valuable as positive information, for it is often as useful to know what not to do as the reverse.

Businessmen also would be saving a lot by working on scientific lines as "Knowledge is power, and nothing is denied to well-directed diligence."

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# First three Essentials of Industrial Development and the need for a Business Education.

By S. Gill Esq., of Messrs Sadhbans and Gill, Government Certified  
auditors for India, Lucknow

— o. —

There are several things essential for commercial and industrial enterprises. The first is capital, without which nothing costly can be done, and on which all modern industry is based

The second is Business Ability. For the successful employment of capital in any line of industrial activity, "Business Ability" is absolutely required.

Capital provides the raw materials of production, which depend upon the services of able men for the proper use of those materials

The third essential is labour. Capital and directing ability want skilled and willing labour, if anything like success is to be accomplished.

All the three, Capital, Business Ability and Labour are equally essential, and there is no superiority of value attached to any one of them. In these days, Capital, Business Ability and Labour are the three legs of a stool. While the three legs stand firm, the stool can be put to use, but let any one of them weaken or break, let it be pulled out or struck out, and down goes the stool, and thenceforth it is of no use, unless the damaged or broken leg is restored

Now the capitalists' theory about the all importance of capital has been proved absurd. Without the support of the other two factors, it is unproductive. In the same way, without Capital and Labour, Business Ability must be unemployed.

Lastly, the assumption that labour is more important than the other two factors I have mentioned, is also wrong. This misapprehension of the position of labour sometimes leads to sad consequences. When the three are harmoniously combined, they work wonders. Separated, none is of any account. Capital, Business and Labour must, then be firmly united in order to obtain the industrial and commercial salvation of this country.

We have sufficient resources at our disposal, and by investment in projects tending to industrial development, we can contribute



to a further advance. We can easily obtain cheap manual labour, but as it is unskilled, we cannot compete with European countries

The Honorable Mr Douie, in his address at the Punjab Industrial Conference, said, "The main reason, no doubt, is that the Lancashire weaver produces in seven or eight hours two and a half times the output of a Bombay worker in twelve or thirteen".

Skilled labour is absolutely necessary for the development of our industries, and therefore we should make it a point to start Technical schools and Colleges, and also get our young men trained in existing factories in India, and in foreign countries

We also lack Business Ability in the men generally charged with the pioneering of industrial concerns Without it, as I have already stated, it is impossible to succeed My aim in the present paper is to explain the necessity of a Business Education. It is as essential as the other two legs of the industrial stool

At the present moment, our energies are directed towards general education, and let us survey the direction, in which we are moving With the present University education, splendid advances have been made in the graduate courses of study, but what relation does this education bear to the public requirements, especially as regards the professional work of the community? I do not decry the admirable results of general culture, obtained from the present studies that have no direct professional objective Not all Bachelors of Arts of the Indian Universities teach, or join the Government Service, and I am certain that those who enter business, are by no means adequately equipped for success in such a walk of life by the curriculum of our Universities As a *miss'aller*, any new graduate of moderate scholarship can become a teacher, but how many would, be equally efficient in Banking, Trade or Industry? The advanced work of our Universities in the general field of literature, arts and science has become without question practically a course for teachers and the undergraduate work has largely been influenced thereby. This is undoubtedly the situation to-day.

Why not frankly ask ourselves this question — Cannot even the under-graduate work of our Universities be so ordered, that our youths may obtain from such courses, as they may be persuaded to take, a training that will fit them for active business life?

It goes without saying, that as the world moves on, new conditions and new demands arise, is it not, therefore, our duty to

readjust our educational forces to the new needs? I can say that in the past our Indian Universities have done very little or nothing to prepare men for the very occupations, which are absolutely essential for the uplift of our commerce and our Industries.

The nature of the new education, which our youths require might be illustrated without going too much into details. It should be possible to distinguish between that which is purely technical and that which is mainly managerial. While a technical and engineering school is required to fit a man to work in the factories, there exists a far greater need for a college to turn out men competent to direct the working of the factory, prepare cash accounts, classify goods, fix prices, push on sales, find markets, watch financial fluctuations, recognise the signs of coming prosperity, be able to grasp questions of labour, and arrange the relations of employers and employees, understand the duties as well as the privileges of joint-stock companies, and with a mind to devise and carry out great financial operations. It may be said that such men are born, and not made, but even a born lawyer must study the principles of jurisprudence in order to do his work.

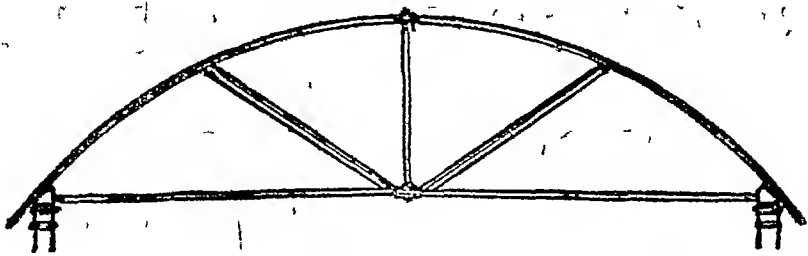
To take an illustration, a preparation for banking, should not be a drill and Technical book-keeping or teaching a messenger how to carry a bag of gold in safety from one institution to another. The essential object of an education leading up to such a profession would be a training in the principles affecting the problems which necessarily arise in local, national, and international Banking. There are principles of money and credit underlying these phenomena often not understood by any of our bank officials. The man who has been taught how to approach such problems and to work out solutions, must, in the end, prove an infinitely better head of a bank than the man who has crept upwards slowly from the window of the teller, and whose education has consisted of the chance events brought to his attention in the round of daily business. Men of this latter description, will become accurate, steady, and useful to the institution in minor positions, but if promoted to higher posts, they will be found to know really nothing beyond the small subjects of their ordinary experience.

To cut short this discourse, Indian Universities have failed to keep in touch with the intellectual demands of a changing and largely commercial world.

We should gird up our loins, organise our powers and start such institutions as will give our young men that education which is absolutely essential for industrial and commercial development. This type of education I call a "Business Education".

I will now close with the words of Mr A. H. Silver, who sometimes ago said, "Let Education (Business Education) be regarded as the handmaid of industry, a means to an end, rather than an end in itself. I refuse to believe that energy and perseverance are lacking in India. They merely require directing into right channels and the earnest attention, which you, gentlemen, are now bestowing upon the subject, will I am confident, eventually bear fruits in the shape of a revival of industry in our midst."

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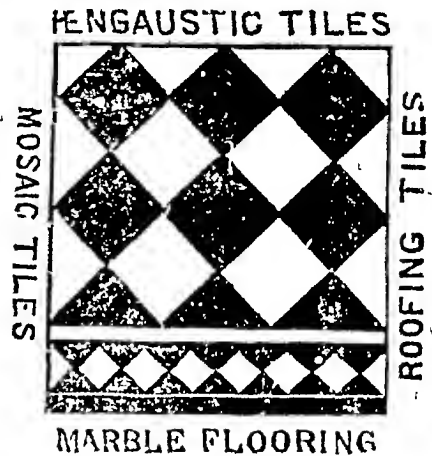
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# A note on the improvement of the indigenous oil industry in the Bombay Presidency.

By N. S. Upasani, Esqr, L T C. a graduate of the Victoria Technical Institute in Chemistry Department, Dhulia, (Bombay)

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1. Since the publication of G. R. N. 10462, dated the 28th December 1914 reviewing the report submitted by Mr Y G Pandit, the Oil Expert Officer, on the existing condition of the oil industry in this presidency, public attention has been seriously drawn to this subject, but little action has yet been taken for the development of this important branch of industry, and it is with a view that some beginning may be made in that direction, so far at least as the indigenous industry is concerned, that I venture to submit a few suggestions for consideration of the committee appointed by Government to consider the subject of the development and promotion of indigenous industries

2 Before proceeding further, I may state that a very large area is used for the cultivation of oil seeds. as will be seen from the accompanying statement I may also state that the oil industry is one of the oldest and most important indigenous industries in this country Every important village has one or more oilmen's families plying their hereditary trade with the old country Ghames It will appear from the figures given in the last census report that there are not less than 1,23,048 Hindu and 45,800 Muhamadan Telis in this Presidency, but of these, only 30,344 with 45,004 dependents are actual workers in their hereditary trade and the rest have been driven to take to other profession wholly or in part (Vide figures given in pages 231,268,288, and 289 of Volume VII Part II of the last Census Report) Even in the case of those who continue to ply their hereditary trade, their condition is far from satisfactory and they have not been able to keep pace with the increasing home and foreign demand for oils and the consequence has been the export of all kinds of oil seeds and oil cakes in large quantities to foreign countries This has affected not only the oil-men alone but also the Agricultural classes, who have been deprived of nutritious food for their cattle and of valuable manure for their lands by the drain of these oil seeds and oil cakes to foreign countries Government in their resolution on Mr. Pandit's report have admitted the need

for action in the matter by the classes concerned, as also by the public bodies and co-operative societies established in the country

3. It is not, however, likely that any serious action will be taken by those bodies, unless some initiative is taken by Government itself. Mr Pandit has pointed out the numerous difficulties in the way of starting and working large oil mills according to Western methods and referred to the various causes which have led to the failures of several of these which were opened on this side, until now. With these failures and the existing depression of trade and commerce, there is little likelihood of new large oil mills being started for a long time to come and our efforts will, I think, have for the present to be directed towards putting on a successful basis the working of the larger mills which have been already started, more particularly improving the indigenous methods which even now yield the greater portion of the total out-put of oil in the country. As regards improving these indigenous methods, the first step to be taken will be to replace the country Ghanies by the rotary Ghanies, wherever that may be possible. It will be seen from Mr. Pandit's report, page 17 that the crushing capacity of an ordinary Ghani is only 60 lbs per day, while that of a rotary power-Ghani is 500 lbs per day. Besides this, the percentage of oil extracted by the rotary Ghani, is larger than that which can be extracted, by the country Ghani. There will thus be double advantage in replacing the country Ghanies by the rotary Ghanies. The Telis as a class are far too illiterate and conservative to realise the necessity for the change. They are besides far too poor to be able to do the needful by themselves without some initial outside help. For this purpose, I think, we may begin with demonstrations of the working of the rotary Ghani to bring home its advantages to the Telis and other classes concerned in the oil business in the several districts. This will not involve any considerable cost to Government. I understand the Agricultural department has already purchased a set of plant for the rotary Ghani and this may be worked for demonstration purposes with the oil engines which are supplied to some of the Agricultural farms and pumping stations in the several districts. When the advantages of the rotary Ghanies are thus established and brought home to the people by actual demonstration, the oilmen themselves will be encouraged to take to them and in the more important towns, there will not be much difficulty in raising the small capital required for the improved Ghanies. From 19-

quiries, which I have been able to make, I understand, that five iron Ghanies and an oil engine with sufficient power to work them will cost about Rs 4000 and this will do the work of fifty bullock Ghanies. The necessary capital may be raised by the Telis forming co-operative societies or unions among themselves, or may be obtained from any co-operative societies started in the Taluka. For the present the demonstration work may be done by crushing the seed from Government Farms, or if that be not available in sufficient quantity, that supplied by the local Telis, agriculturists or merchants and charging for the same only sufficient amount to cover the cost of working. This will prove by actual experiment the advantages of the improved iron Ghani and it will make itself popular with the Telis and the public generally as has happened in the case of iron presses for pressing sugarcane. The oilmen themselves with their traditional experience and hereditary aptitude, will be easily trained to work the new Ghanies without much difficulty.

4. As regards the stock of seeds required for working the Ghanies by the Telis, in cases where they might not afford the necessary means to purchase the stock required to work them, it may be possible to organise a few societies of agriculturists who grow oil seeds in large quantities. They should individually or by unions supply the needful stock to the oilman and let him have the oil at a reasonable rate for retail sale and take the oil cake to be used for their own cattle and for manure. Co-operation between the two classes may well be organised on this basis by the officer in charge of the demonstration or by the local officers in charge of co-operative societies or by the officers of the agricultural department working in the various districts.

5. The official in charge of the demonstration will moreover have opportunities of carefully checking the relative percentages of the yield of the several kinds of oil seeds, and of different varieties of the same seed and in different districts or in different soils in the same district. That experience will be specially valuable in the interest of the agricultural class as also for the oilmen, for they will be able to get a good and pure supply of oil.

6. As regards further expansion of this branch of industry on a larger scale on the lines adopted in the West, there is unlimited scope in the case of the more important oilseeds, viz. nigerseed, safflower, cotton, linseed, castorseed and others. In the case of these



seeds, it will have to be considered, whether part of the existing machinery and the steam power now used up for working cotton gins and presses could not be utilised with the addition of suitable plant for crushing and refining the oil. At present, the ginning and press factories work for only 4-5 months at the most during the cotton season and the machinery and power is kept unused during the greater part of the year. Even during the season time, only a few of the factories are actually working and the rest share the profits under joint agreements without having to work their plant. This may be seen on reference to the Government Report on Boiler Inspection which will show that the majority of the registered boilers are not submitted for inspection.

7 In these factories, cotton seed will be available for crushing on the spot without any additional charge for carriage and the godowns and other buildings will be available for storing stock of the oilseeds and other necessary purposes. It will not be difficult to induce the more intelligent factory owners to put the required additional plant if demonstration of these are actually made in a few cases. It will also be possible to demonstrate the various methods in which the oils and their by-products may be utilised for commercial purposes in crude form and after refining. This will help in starting small secondary industries with by-products and the oils themselves. The co-operation of the agricultural and the co-operative societies departments will, I think, be able to show the initiative even in the further development of the industry with the scientific and expert knowledge at their disposal.

8 The scheme I suggest may at first be tried in the Central Division and later on extended to the other parts of the country in the light of the success of its working in this Division.

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**Statement showing area in acres under important oil seeds and sugarcane and total irrigated area in the districts of Central Division, Bombay Presidency.**

District	Sesame.					Castor					Ground nut					Safflower				
	1910-11	1911-12	1912-13	1913-14	1914-15	1910-11	1911-12	1912-13	1913-14	1915-15	1910-11	1911-12	1912-13	1913-14	1914-15	1910-11	1911-12	1912-13	1913-14	1914-15
W Khandesh	53209	42494	42915	40325	37807	17910	15767	32947	28692	15389	1615	1017	1325	2564	2063	8	38	5	5	9
E Khandesh	22140	17717	19345	16332	15787	1514	756	1624	1313	1123	2798	2002	2794	3573	224	1688	1428	869	1241	1535
Nasik	64756	78440	56067	34079	25699	1489	1376	1026	1084	1045	10680	12337	13354	16338	18133	13384	14957	9193	11374	10871
Ahmednagar	52021	46546	31874	43556	56773	278	281	172	192	444	4254	5139	3608	4506	6330	116925	87429	82167	88393	91925
Poona	7390	3533	4308	3647	4743	191	94	142	111	97	12680	12721	15511	15997	18736	66547	42967	58726	57686	60042
Sholapur	11651	13047	9494	12263	13056	2273	1773	1519	900	1549	37905	55326	39768	42643	48744	122464	66796	102370	52632	86236
Satara	394	299	377	289	268	280	475	417	367	268	74470	95461	85988	84829	91215	23742	21482	26050	31927	29642

District	Lunseed					Sugar cane/tonne					Total Irrigated area				
	1910-11	1911-12	1912-13	1913-14	1914-15	1910-11	1911-12	1912-13	1913-14	1914-15	1910-11	1912-12	1912-13	1913-14	1914-15
V Khandesh	16440	8822	1835	11540	3133	730	904	356	618	753	21361	28572	36152	21962	26405
Khandesh	3906	4517	1164	1434	1958	439	376	410	261	354	23930	31442	34355	22934	26878
Nasik	41135	59107	48497	35889	21221	4389	6581	1960	5029	5388	80532	95709	96690	88680	93499
Ahmednagar	17319	18140	5424	7587	7398	1760	2346	2477	2676	3909	90575	145673	130392	90295	85901
Poona	1475	418	1258	700	958	14187	15586	13772	12874	13117	116549	106682	117757	132367	132929
Sholapur	24186	21244	14485	4501	10866	2422	2732	1859	1301	1566	97806	115986	110158	98483	100075
Satara	3557	3125	3813	3363	3236	9949	10700	8126	9670	8533	101044	90905	96225	98801	97772



## APPENDIX I

### Resolutions Passed at the First Indian Industrial Conference

*Held at Benares, on the 30th December, 1905.*

Resolved that this Conference urges the Government of India and all Provincial Governments and Administrations, as also the people of India according to their powers and opportunities,—

(1) To found Technical Schools in all large centres for the industrial education, on an adequate scale, of the Indian people ;

(2) To encourage and help Indian manufactures ,

(3) And to foster and extend the use of such manufactures in India in preference to foreign goods.

Proposed by the Honourable Munshi Madho Lal (Benares).

Seconded by Mr. A. Chowdhri (Calcutta).

Supported by Mr. N. Subba Rao (Rajahmundry).

#### II.

Resolved that this Conference urges all Provincial Governments and Administrations as well as the proprietors and managers of private schools and colleges to add commercial classes, and industrial classes like those of weaving, dyeing carpentry, &c, to the existing educational institutions where practicable

Proposed by Mr G. Subramania Iyer (Madras).

Seconded by Mr Ali Mahomed Bhimji (Bombay).

#### III.

Resolved that this Conference specially invites the attention of Indian capitalists to the great importance of introducing the use of improved hand-looms among the weavers of India, and recommends the establishment of weaving schools where boys may learn the use of such looms, with a view to their more extended use among the towns and villages of all Provinces in India

Proposed by Mr Piabhas C Mitra (Calcutta).

Seconded by Mr Babulal Govika (Aligarh).

Supported by Mr. Fazal Hassain (Aligarh).

## IV.

Resolved that this Conference urges Indian capitalists to establish at their own cost schools for spinning, dyeing, pottery, carpentry and the manufacture of ironware and brassware, in order to afford facilities to boys of all castes and classes to learn such useful industries as a means of their livelihood

Proposed by Rai Bahadur Lala Baij Nath (Allahabad).

Seconded by Pandit Rambhaji Dutt Chowdhri (Lahore),

Supported by Mr. L. R. Das (Calcutta).

## V.

Resolved that where it is possible to raise large funds for industrial education, this Conference recommends the placing of such funds in the hands of trustees with a view to the establishment of Technological Colleges on the most modern methods adopted in Europe, America and Japan for the training of large numbers of students in the various industries which are profitable in India

Proposed by Sir Bhalchandra Krishna, Kt., (Bombay).

Seconded by Rai Saheb Lala Girdhari Lal (Delhi)

Supported by Mr Sukhbir Singh (Muzaffarnagar).

## VI.

Resolved that Provincial Committees be established in Bengal, Bombay, Madras, the United Provinces, the Punjab, and the Central Provinces and Berar consisting of the members named below for giving effect to the above recommendations, generally encouraging industries and making an industrial survey in their several provinces and compiling useful facts and suggestions for submission to the next Industrial Conference in December 1906 In order to carry out these views, each Committee is requested to raise suitable funds, appoint trustees, frame rules for the conduct of business and lay their accounts before the next Industrial Conference.

Resolved that the following gentlemen be members of the Provincial Committees for the year 1906, with power to add to their number —

## BENGAL

T. Palit, Esq

The Honourable Mr. J. Chawdhari.

R. N. Mookerji, Esq.

BOMBAY.

D E Wacha Esq  
The Honourable Mr Vithaldas D. Thackersey.<sup>1</sup>  
Lallubhai Samaldas, Esq

MADRAS.

N Subba Rao, Esq  
The Hon'ble Mr L. A. Govindaraghava Iyer.<sup>1</sup>  
V Krishnaswami Iyer, Esq.

UNITED PROVINCES.

Rai Bahadur Lala Baij Nath  
The Honourable Pandit Madan Mohan Malaviya.<sup>1</sup>  
Munshi Ganga Prasad Varma

THE PUNJAB

Rai Bahadur Lala Ganga Ram, C. I. E.  
Shaikh Umar Baksh  
Lala Harkishenlal.  
Lala Lajpat Rai  
Lala Mulkaraj

CENTRAL PROVINCES AND BERAR.<sup>1</sup>

Rao Bahadur R N Mudholkar.  
G S Khaparde, Esq  
M V Joshi, Esq  
Proposed by Lala Lajpat Rai (Lahore)  
Seconded by Rai Bahadur Ganga Ram (Lahore).  
Supported by the Honourable Mr. L. A. Govindaraghava  
Iyer (Madras).

VII.

Resolved that this Conference appoints Rao Bahadur  
R N. Mudholkar as General Secretary, empowers the President  
to appoint a permanent Assistant Secretary and establishment  
on suitable pay and allots a sum of Rs 5,000 for meeting the  
expenses of the next twelve months

Proposed by the Honourable Pandit Madan Mohan  
Malaviya (Allahabad).

Seconded by Mr. C. Vijayaraghavachariar (Salem).

R. C DUTT,  
*President.*

BENARES,

*The 30th December 1905.*

R. N. MUDHOLKAR,  
*General Secretary.*



## Resolutions Passed at the Second Indian Industrial Conference.

*Held at Calcutta on the 29th and 31st December, 1906.*

### 1 TECHNICAL AND COMMERCIAL EDUCATION

RESOLVED—That this Conference re-affirms the Resolution passed at the Conference of last year on the subject of Technical and Commercial Education, and requests the Government to establish a sufficient number of Secondary Technical and Commercial Schools, a superior Technical College for each Province, and one fully equipped first class College of Technology for all India. And that a Committee consisting of the President, the General Secretary, Messrs. R C Dutt, D E Wacha, G. V Joshi, G. Subramania Iyer, Lajpat Rai, P N Bose, A. C Sen, Deva Prasad Sarvadhikari and Dr Nil Ratan Sircar, be appointed to prepare a memorial on the above lines for submission to Government by the President and the General Secretary

Proposed by V Krishnaswami Iyer, Esq., (Madras).

Seconded by Deva Prasad Sarvadhikari, Esq., (Calcutta)

Supported by Babu Ambika Charan Mitra. (Pabna).

„ G A. Natesan, Esq., (Madras) and carried unanimously.

### II. THE INDIAN STORES COMMITTEE

RESOLVED—That this Conference conveys its thanks to the Government of India for appointing a Committee for making recommendations for the use by Government departments of indigenous articles in preference to foreign goods ; and requests that they be pleased to direct the early publication of the Report of the Committee, so that the public and the trades in India may have an opportunity of considering it before final orders are passed on the subject.

Proposed by Sir Bhalchandra Krishna (Bombay).

Seconded by K Natarajan, Esq , (Bombay).

Supported by Mouly Muhammad Nizamuddin Hassan (Lucknow), and carried unanimously.

### III INDUSTRIAL SURVEY.

RESOLVED—That in view of the importance of having an Industrial Survey of India made by Government, and having

regard to the recommendation made by the Committee on Industrial Education to that effect, this Conference requests Government to make such a survey and empowers the President and the General Secretary to submit a memorial on the subject

Proposed by Rao Bahadur R. N. Mudholkar (Amraoti )

Seconded by Bipradas Pal Chowdhuri, Esq , (Calcutta )

Supported by S. C. Mookerjee, Esq , (Calcutta) and carried unanimously

#### IV SUGGESTIONS TO THE PUBLIC.

RESOLVED—That this Conference specially invites the attention of the public to the great importance of introducing the use of improved hand-looms among the weavers of India, of promoting Technical Education by the establishment of schools and classes, and of starting laboratories for the purpose of determining the industrial value of Indian products

Proposed by Dewan Bahadur Ambalal S (Ahmedabad )

Seconded by Viswanath P. Vaidya, Esq , (Bombay )

Supported by Dr. Nil Ratan Sircar (Calcutta )

Supported by Shet Damodardas Khivraj (Beāwar) and carried unanimously

#### V. THE CONFERENCE PROVINCIAL COMMITTEES.

RESOLVED—That the Provincial Committees already established be asked besides taking steps to promote industries in their several provinces, to compile useful facts and suggestions for submission to the next Industrial Conference, and to raise suitable funds for carrying on their works

Proposed by Dewan Bahadur L. A. Govindaraghava Iyer (Madras).

Seconded by Babu Ambica Charan Ukil (Calcutta )

Supported by A. Ramanna, Esq., (Mysore) and carried unanimously.

#### VI. APPOINTMENT OF OFFICE-BEARERS AND PROVISION OF FUNDS FOR THE YEAR 1907

RESOLVED—That this Conference reappoints Rao Bahadur R. N. Mudholkar as General Secretary and Mr. C. Y. Chintamani as Assistant Secretary, and empowers the President and the General Secretary to appoint an additional Assistant Secretary and an establishment on suitable pay, so

that the Assistant Secretary may be free to visit the different provinces and help the Provincial Committees in all matters in which they may require assistance. And this Conference allots a sum of Rs 10,000 for meeting the expenses for the next twelve months, and also for issuing a quarterly bulletin of industrial information under suitable management.

Proposed by R C Dutt, Esq, C I E, (Baroda)

Seconded by Rai Bahadur, P Ananda Charlu, C I E.

(Madras), and carried unanimously

VITHALDAS D. THACKERSEY,  
*President.*

R N MUDHOLKAR,  
*General Secretary,*

### Resolutions Passed at the Third Indian Industrial Conference.

*Held at Surat, on the 30th December, 1907.*

#### I INDUSTRIAL SURVEY

RESOLVED—That this Conference expresses its sense of satisfaction that an Industrial Survey has been carried out in the United Provinces and is being carried out in the Central Provinces and Berar, and in the Baroda State, and it would urge other Provincial Governments in British India and the Governments of other Indian States to carry out at an early date Industrial Surveys of the territories within their jurisdiction, as exact and detailed information would afford facilities for the introduction of a sound system of Technical Education and the well-ordered development of indigenous industries.

(Proposed by Sir Bhalchandra Krishna, *Kt.*, of Bombay, seconded by K Natarajan, Esq, of Bombay, and carried unanimously.)

#### II TECHNICAL AND COMMERCIAL EDUCATION.

RESOLVED—(a) That this Conference reaffirms the Resolution on Technical and Commercial Education passed at the last Conference

(b) That this Conference thanks the Government of the United Provinces for the action taken by them with a view to introduce a fairly comprehensive system of Technical Education in those Provinces and would express the hope

that other Provincial Governments will be pleased to convene Representative Conferences such as the recent Naini Tal Conference to devise measures for the spread of Technical Education in their respective Provinces. And this Conference further expresses the hope that the Government of India would provide adequate funds for giving effect to the recommendations of the Naini Tal Conference and carrying out similar schemes in other Provinces

(c) That this Conference, while appreciating the action taken by the Governments of some Indian States to encourage Technical Education, urges that further steps should be taken in the same direction in all Indian States

(d) That this conference welcomes the growth of public interest in Technical Education, as shown by the action taken by certain local and municipal boards and private associations in promoting it, and strongly urges on the leaders of the people the necessity of taking practical steps for providing increased facilities for it by starting institutions and founding scholarships to encourage technical studies in India and abroad

(Proposed by R. C. Whitenack, Esq., of Baroda seconded by D. G. Dalvi, Esq., of Bombay, supported by Ishwar Das Varshni, Esq., of Aligarh and Professor Ruchi Ram Sahni, of Lahore, and carried unanimously)

### III AGRICULTURAL EDUCATION

RESOLVED—That this Conference records its sense of appreciation of the action taken and contemplated by the Government in regard to the establishment of Agricultural Colleges in the several Provinces, and would urge that in view of the importance of a wider spread among the cultivating and land-holding classes of a practical knowledge of the principles of scientific agriculture and modern methods, Government would be pleased to establish Experimental and Demonstration Farms as widely as possible, and to start vernacular schools in connection with them, one at least in every district.

(Proposed by G. Subramania Iyer, Esq., of Madras, seconded by Rao Bahadur Khandubhai Desai of Surat, and carried unanimously)

### IV. AGRICULTURAL BANKS.

RESOLVED—That this Conference begs to call the attention of Government to the urgent need of promoting the establishment of Agricultural Banks to help Co-operative Credit Societies and to advance loans directly to agriculturists

at reasonable rates of interest, and further begs to suggest that the advice and co-operation of representative members of the Indian community may be enlisted in devising a suitable scheme to secure this object

(Proposed by Rao Bahadur Lalshankar Umashankar of Ahmedabad, seconded by Thakorram Kapilram, Esq., of Surat, and carried unanimously)

## V. THE MINING INDUSTRY.

RESOLVED—(a) That this Conference expresses its sense of satisfaction at the successful formation of the Tata Iron and Steel Company, Limited, with the help entirely of capital raised in India.

(b) That this Conference invites the attention of capitalists in India to the urgent need of developing and fully utilising the mineral resources of the country and trust that in view of the ultimately lucrative character of the industry, they will make organised efforts in that direction

(c) That this Conference is of opinion that special consideration should be shown to Indian enterprise and initiation by the Government and preferential treatment given to them

(Proposed by Rao Bahadur R. N. Mudholkar, of Amraoti, seconded by the Honourable Mr. Gokuldas K. Parekh, of Bombay, and carried unanimously).

## VI. COTTON SPINNING AND WEAVING.

RESOLVED—(a) That this Conference records its sense of satisfaction at the stimulus the Spinning and Weaving Industries have received from the Swadesi movement and it urges the bestowal of increased attention on cotton cultivation, the erection of Spinning and Weaving Mills at suitable centres, and the revival of the Hand-loom-Weaving Industry on a commercial basis, as essential to the success of the movement.

(b) That this Conference urges the Government to remove the restrictions regarding the expansion of the industry and to provide facilities for affording practical instruction in weaving by the establishment of Weaving Schools at every important weaving centre.

(Proposed by L. K. Tulasiram, Esq., of Madura, seconded by S. B. Sankaram, Esq., of Elore, and carried unanimously.

## VII. THE SUGAR INDUSTRY

RESOLVED—(a) That this Conference notices with concern the increase in the imports of foreign sugar, and is of opinion

that to arrest the steady decline of the indigenous industry, it is absolutely necessary to encourage the cultivation of healthier and more prolific varieties of cane, to employ greater care in cultivation, to use more economical processes for extracting the juice, and, above all, to adopt the most modern and efficient methods of refining

(b) That this Conference urges the Government to provide more extensive irrigational facilities, to allow the utilisation of by-products, and, further to consider the desirability of imposing a duty upon imported sugar in order to protect the indigenous industry.

(Proposed by the Hon'ble Pandit Madan Mohan Malaviya, of Allahabad, seconded by Manubhai Nandshankar, Esq., of Baroda, supported by Lala Dharamdas Suri, of Lahore, and Chunilal Vrijbhukandas, Esq., of Bombay, and carried unanimously)

#### VIII APPOINTMENT OF OFFICE-BEARERS AND PROVISION OF FUNDS FOR THE YEAR 1908

RESOLVED—That this Conference reappoints Rao Bahadur R N Mudholkar as General Secretary and Mr. C Y Chintamani as Assistant Secretary, and it appeals to the public for a sum of Rs 10,000 for meeting the expenses for the next twelve months

(Proposed by Sir Bhalchandra Krishna, Kt, of Bombay, seconded by the Hon'ble Pandit Madan Mohan Malaviya, of Allahabad, and carried unanimously)

AMBALAL SAKERLAL DESAI,

*President.*

SURAT,  
The 30th December, }  
1907.

R N MUDHOLKAR,  
*General Secretary,*

#### Resolutions Passed at the Fourth Indian Industrial Conference

*Held at Madras on the 26th and the 27th December, 1908.*

##### I DEPARTMENTS OF INDUSTRY.

RESOLVED—(a) That this Conference is of opinion that there should be in every province of British India, a Department of Industry under a Director of Industries to deal with industrial questions and to be in charge of technical and commercial education as well as industrial instruction ;

and that there should be an Advisory Board of qualified persons, not less than one-half of whom should be non-official Indians, who should be consulted on all matters of importance;

(b) that the functions of this Department should include (1) the supply of advice in regard to new industries, (2) the introduction of new or improved methods and processes (3) the carrying out of investigation and experiments, (4) the development of selected industries, and (5) the organization of industrial and commercial exhibitions,

(c) that there should be an industrial museum and a bureau of information under the Department of Industry for supply of information to the public on industrial and commercial matters

(Proposed by D. E. Wacha, Esq., (Bombay), seconded by Rao Bahadur G. Srinivasa Rao, (Madura), supported by R. V. Mahajani, Esq. (Akola), and carried unanimously).

## II TECHNICAL AND INDUSTRIAL EDUCATION.

RESOLVED—That this Conference reaffirms the Resolutions of the previous Conferences on Technical and Industrial Education, and urges (1) that the Victoria Jubilee Technical Institute, Bombay, and the College of Science, Poona, be enlarged so that they may between them supply for the Presidency of Bombay technological instruction in all branches of mechanical and chemical industries, (2) that the Government of India may sanction the proposal of the Government of Bengal to add classes in industrial Chemistry to the Sibpur Engineering College; (3) that Government of Madras will be pleased to give effect to the recommendation of the Ootacamund Industrial Conference that the Madras College of Engineering should be expanded into an Institute of Technology, (4) that the Secretary of State might accord early sanction to the proposal of the Government of the United Provinces that a College of Technology should be opened at Cawnpore, and (5) that similar institutions should be established in the Punjab, Burma, Eastern Bengal and Assam

(Proposed by the Hon'ble Pandit Madan Mohan Malaviya (Allahabad), seconded by the Hon'ble Mr. Gokuldas K. Parekh (Bombay), supported by T. Rangachariar, Esq., (Madras), and Lalla Dharam Das Suri, (Lahore), and carried unanimously).

## III. COMMERCIAL EDUCATION.

RESOLVED—(a) That in the opinion of this Conference, the time has come for the Indian Universities to create

faculties of Commerce, and institute Degrees in Commerce, and to affiliate Commercial Colleges that will prepare candidates for University Degrees in Commerce ;

(b) that there should be established one College of Commerce at each Provincial capital and that it should include provision for the training of teachers for Commercial Schools in the mofussil.

Proposed by K Subramania Aiyar, Esq , (Bombay), seconded by D G Dalvi, Esq , (Bombay), and carried unanimously).

#### IV AGRICULTURAL BANKS.

RESOLVED—That this Conference again invites the attention of the Supreme and the Provincial Governments to the urgent need for Agricultural Banks both to assist Co-operative Credit Societies and, in cases where Co-operative Credit Societies cannot or will not serve, to advance loans directly to agriculturists on easy terms, and urges them to take early action in the desired direction in conjunction with Indian capitalists who, the Conference feels confident, would be ready to co-operate with Government in any such scheme

(Proposed by Lallubhai Samaldas, Esq , (Bombay), seconded by Rao Bahadur Khandubhai G Desai, (Surat,) supported by Rao Bahadur V K Ramanujachariar, (Kumbakonam), and carried unanimously )

#### V COTTON EXCISE DUTY.

RESOLVED—That this Conference records its emphatic protest against the continuance of the Excise duty on Indian mill-made cloth as an unjust and unnecessary impost and urges that it should be removed without delay

Proposed by Uttamlal K Trivedi, Esq , (Bombay), seconded by Pandit Rambhuj Dutt Chowdhuri, (Lahore), and carried unanimously.

#### VI. RAILWAY RATES ON GOODS

RESOLVED—That this Conference calls the attention of the Government to the prevailing complaints about existing railway rates, and suggests that an enquiry should be instituted into their effect on indigenous industries especially in their competition with imported goods, and further submits that the rates should be reduced, where their effect may be proved to be injurious.

Proposed by Dewan Bahadur Ambalal S Desai, (Ahmedabad), seconded by Rao Bahadur Deorao Vinayak, (Akola), and carried unanimously )



## VII. MINING, WEAVING AND SUGAR INDUSTRIES.

RESOLVED—That while expressing its satisfaction at the steady progress of the Swadeshi movement, this Conference, concurring with the last Conference, calls the particular attention of capitalists and the general public to the necessity of developing the Mining, Weaving and Sugar Industries, and urges the formation of Joint-Stock Companies for working mines and erecting mills and factories

(Proposed by the Hon'ble Sir Vithaldas D Thackersey, Kt., (Bombay), seconded by G Subramania Iyer, Esq, (Madras), supported by the Hon'ble Mr H S. Dikshit, (Bombay), and carried unanimously).

## OFFICE-BEARERS AND FUNDS FOR NEXT YEAR

RESOLVED—That this Conference reappoints Rao Bahadur R N Mudholkar as General Secretary and Mr C Y Chintamani, as Assistant Secretary for the year 1909, and appeals to the public for a sum of Rs 5,000 to meet the expenses of the next twelve months

(Proposed by N Subba Rao Pantulu, Esq, (Rajahmundry), seconded by Babu Gunga Prasad Varma, (Lucknow,) and carried unanimously.

MADRAS,	}	R N. MUDHOLKAR,
<i>The 27th December, 1908</i>		<i>President.</i>

## Resolutions passed at the Fifth Indian Industrial Conference

*Held at Lahore on the 30th December, 1909*

## I DEATH OF MR. R C DUTT.

RESOLVED—That this Conference places on record its profound sorrow for the sad death of its first President, the late Mr Romesh Chunder Dutt, C I E The industrial movement has lost in him one of its ablest and most zealous champions, and the country, one of her most accomplished, earnest and patriotic sons That this Conference authorizes the General Secretary to convey the above Resolution to the widow and son of Mr. Dutt.

## II. PURCHASE OF STORES BY GOVERNMENT DEPARTMENTS.

RESOLVED—That this Conference thanks the Secretary of State and the Government of India, for the orders, which have been recently issued, in regard to the purchase by Government Departments of articles, made in India, in preference to those of foreign manufacture. The Conference,

while recognising the fact that these orders mark a distinct advance in the policy of Government towards the encouragement of indigenous industries and manufactures, is of opinion that the report of the Committee be published for general information and guidance in the future

### III TECHNICAL AND INDUSTRIAL EDUCATION.

RESOLVED—That this Conference regrets that the proposal of the United Provinces Government for the establishment of a Technological College at Cawnpore, which was supported by the Government of India, has not been sanctioned by the Secretary of State. In view of this fact, this Conference reaffirms the Resolutions of the previous Conference on Technical and Industrial Education and again urges —

(1) that the Victoria Jubilee Technical Institute of Bombay, and the College of Science at Poona, be enlarged so that they may between them supply for the Presidency of Bombay technological instruction in all the branches of mechanical and chemical industries ,

(2) that the Government of India may sanction the proposal of the Government of Bengal to add classes in Industrial Chemistry to the Sibpore Engineering College ,

(3) that the Government of Madras will be pleased to give effect to the recommendation of the Ootacamund Industrial Conference that the Madras College of Engineering should be expanded into an Institute of Technology ,

(4) that the Secretary of State might accord early sanction to the proposal of the Government of the United Provinces that a College of Technology should be opened at Cawnpore , and

(5) that similar Institutions should be established in the Punjab, Burma, Eastern Bengal and Assam

### IV. COMMERCIAL EDUCATION

RESOLVED—(a) That in the opinion of this Conference the time has come for the Indian Universities to create Faculties of Commerce and institute degrees in Commerce and to affiliate Commercial Colleges that will prepare candidates for University degrees in commerce ,

(b) that there should be established one College of Commerce in each provincial capital and that it should include provision for the training of teachers for Commercial Schools in the mofussil

## V AGRICULTURAL BANKS

RESOLVED—That the Conference again invites the attention of the Supreme and Provincial Governments to the urgent need of establishing Agricultural Banks for assisting the existing Co-operative Credit Societies and for advancing loans direct to agriculturists on easy terms, wherever such societies do not exist, with the view of ameliorating the economic condition of the Indian peasantry

## VI COTTON EXCISE DUTY.

RESOLVED—That the Conference records again its emphatic protest against the continuance of the Excise duty on Indian mill-made cloth as an unjust and unnecessary impost which presses heavily on the industry, and prays that it should be abolished at the earliest opportunity.

## VII. WEIGHTS AND MEASURES

RESOLVED—That this Conference invites the attention of the Government of India to the desirability of introducing uniform weights and measures to facilitate trade among the different towns and provinces of India, to prevent fraudulent practices of traders and remove the present inconveniences arising from a multiplicity of weights and measures and from a want of uniform system and standard.

## VIII OFFICE-BEARERS AND FUNDS FOR NEXT YEAR.

RESOLVED—That this Conference reappoints Rao Bahadur R N Mudholkar as General Secretary and authorizes him to appoint an Assistant Secretary with suitable establishment and appeals to the public for a sum of Rs. 5,000 to meet the expenses of the next twelve months

RAMESHWAR SINGH,

*President*

30th December, 1909

}

R. N. MUDHOLKAR,  
*General Secretary*

Resolutions passed at the Sixth Indian Industrial Conference

*Held at Allahabad on the 30th December, 1910.*

I VOTE OF SORROW FOR THE DEATH OF HIS LATE  
MAJESTY, KING-EMPEROR, EDWARD VII

RESOLVED—That this Conference places on record its profound sorrow at the death of His late Majesty King-Emperor, Edward VII, in whom the people of India have lost a

most sympathetic and warm-hearted well-wisher and supporter, the Empire a wise and benevolent sovereign and the world a powerful promoter of peace and general amity, and respectfully tenders its condolence to Her Majesty Queen-Empress Alexandra and the members of the Royal Family

(Put from the Chair in solemn silence, the whole audience standing, and carried unanimously)

## II. HOMAGE TO HIS MAJESTY, KING-EMPEROR, GEORGE V.

RESOLVED—That this Conference begs to offer its respectful and loyal homage to His Majesty King-Emperor George V, on his accession to the throne of the British Empire and expresses the hope that His Majesty's gracious sympathy for the people of this country and interest in their well-being will effectively promote their prosperity and advancement.

(Moved from the Chair and carried unanimously and by acclamation.)

## III. TECHNICAL EDUCATION

RESOLVED—(a) While gratefully acknowledging the grants to technical and industrial education made by Government in recent years, this Conference places on record its firm conviction that, for effectively promoting the industrial progress of this country, it is essential that the Government should establish here at least one fully equipped Polytechnic College for imparting the highest kind of instruction in the applied sciences and industrial arts, and further urges that the visit of His Majesty, King-Emperor George V and Her Majesty, Queen-Empress Mary should be commemorated by foundation of such an institution.

(b) This Conference also invites business scientific and technical experts to form themselves into a working organization for the creation of a scientific, technological and commercial literature in the Indian Vernaculars for the dissemination of information on industrial and commercial subjects amongst the people of India

(Proposed by Sir Bhalchandra Krishna, Kt, of Bombay, seconded by Pandit Gokarnanath Misra of Lucknow, supported by Babus Laxmi Chand and Thakur Prasad and carried unanimously).

## IV. COMMERCIAL EDUCATION.

RESOLVED—(a) In the opinion of this Conference the time has come for the Indian Universities to create Faculties of

Committee to institute Degrees in Commerce, and to affiliate Commercial Colleges which will prepare candidates for such Degrees

(b) That there should be established one College of Commerce in each provincial capital and that it should include provision for the training of teachers for commercial schools in the mofussil

(Proposed by Mr C. Gopal Menon of Madras, seconded by Mr Gulabchand Javeri and carried unanimously)

#### V EXCISE DUTY ON COTTON GOODS

RESOLVED—This Conference again records its emphatic protest against the continuance of the Excise Duty on Indian mill-made cloth as an unjust and unnecessary impost which presses heavily on the industry and prays that it should be abolished at the earliest opportunity

(Proposed by the Hon'ble Mr Gokuldas K Parekh, of Bombay, seconded by Mr Muthuradas Ram Chand Javeri, of Sind, supported by Mr Mowjee Govindjee Shet, of Bombay, and carried unanimously)

#### VI THE INDIAN FACTORIES BILL

RESOLVED—This Conference is of opinion that the provisions of the Indian Factories Bill of 1909 involve a serious, unnecessary and uncalled for interference with the rights of adult male labour and urges that the sections of the Bill which involve such restrictions be dropped

(Proposed by the Hon'ble Sir Vithaldas D Thackersey, seconded by Mr D E Wacha, supported by the Hon'ble Rao Bahadur R N Mudholkar and carried unanimously. Two amendments were proposed but they were lost).

#### VII MERCHANDISE MARKS ACT

RESOLVED—This Conference draws the attention of Government to the use, on several articles manufactured outside India, of misleading descriptions, impressions, or marks, calculated to cause the belief among purchasers and consumers that the same were made in India and urges that steps be taken, by legislation, if necessary, to prevent such and similar fraudulent practices by requiring in every case the indication of the country of origin

(Proposed by Mr. M B Sant of Amraoti, seconded by Mr. J. P Kotilingam, of Madras, and carried unanimously).

## VII WEIGHTS AND MEASURES

**RESOLVED**—This Conference reaffirms Resolution No. VII of last year's Conference and again invites the attention of the Government of India to the desirability of introducing uniform weights and measures to facilitate trade among the different towns and provinces of India, and remove the present inconveniences arising from a multiplicity of weights and measures and from want of a uniform system and standard

Proposed by the Hon'ble Rao Bahadur R. N. Mudholkar, seconded by Mr Goswami Brijnath, and carried unanimously).

## IX. AGRICULTURAL BANKS

**RESOLVED**—This Conference notes with regret that the Secretary of State has not sanctioned the scheme drawn up by some of the leading financiers of Bombay of an Agricultural and Industrial Bank, though the same had received the support of the Government of Bombay and the Government of India, and again urges upon Government its conviction that for securing the amelioration of the economic condition of the peasantry and the land owing classes, it is necessary to establish agricultural banks for assisting the existing Co-operative Credit Societies and for advancing loans direct to agriculturists wherever such societies do not exist.

(Proposed by Mr G K Devadhar, of Poona, seconded by Mr. Mahesh Charan Sinha. Babu Ambica Charan Ukil moved an amendment, which the President ruled out of order. The original resolution was carried unanimously).

## X JOINT-STOCK COMPANIES

**RESOLVED**—This Conference considers that it is desirable to bring the law regulating Joint-Stock Companies in India in a line with the law in England, as laid down in the recent Companies Consolidation Act, with such modifications as will suit the circumstances of this country.

Proposed by Mr. J K. Mehta, of Bombay, seconded by Mr. B. F. Karbhari and carried unanimously )

## XI ABOLITION OF THE DEPARTMENT OF INDUSTRIES.

**RESOLVED**—This Conference records its sense of deep regret at the action of the Secretary of State in directing the abolition of the Department of Industries in Madras and lodges a protest against the policy laid down by him that the State should not pioneer new enterprises, as unduly limiting State help in industrial development.

(Proposed by Mr. C. Y. Chintamani, of Allahabad, seconded by the Hon'ble Sir Vithaldas D Thackersey, and carried unanimously).

## XII DUTY ON SUGAR.

RESOLVED—This Conference is strongly of opinion that it is essential that the Government should impose an adequate import duty on foreign sugar in order to enable the indigenous industry to hold its own.

(Proposed by the Hon'ble Rai Bahadur Ramanuj Dyal, seconded by Mr. J. P. Kotilingam, and carried unanimously).

A resolution on Octrio duty levied in some parts of India was moved, but its consideration was postponed owing to a difference.

## XIII. APPOINTMENT OF OFFICE-BEARERS AND APPEAL FOR FUNDS.

RESOLVED—That the Conference reappoints the Hon'ble Rao Bahadur R N Mudholkar as General Secretary and authorises him to appoint an Assistant Secretary with suitable establishment and appeals to the public for a sum of Rs. 5,000 to meet the expenses of the Industrial Conference Office for the next twelve months.

(Proposed by the Hon'ble Pandit Madan Mohan Malaviya, seconded by Babu Ganga Prasad Varma, and carried unanimously).

R. N. MOOKERJEE,

*President.*

ALLAHABAD,

*The 30th December 1910.* }

R. N. MUDHOLKAR,

*General Secretary.*

**Resolutions Passed at the Seventh Indian Industrial Conference.**

*Held at Calcutta on the 29th December, 1911*

### RESOLUTION I.

#### *Homage to Their Imperial Majesties*

The Indian Industrial Conference assembled in its seventh Session humbly and respectfully tenders its most dutiful and loyal homage to Their Imperial Majesties King-Emperor George V and Queen-Empress Mary on the occasion

## XIX

of Their visit to India to graciously announce in person the solemnities of Their coronation to their faithful and loving subjects in this country. The Conference begs to express its grateful rejoicings at the benign assurances of sympathy and regard given in the Royal Proclamation and the boons bestowed upon the people to promote their happiness and prosperity and secure their contentment and attachment.

*Moved from the Chair.*

### RESOLUTION II.

*The late Hon'ble Mr V Krishnaswami Iyer*

The Conference expresses its profound sorrow at the sad and untimely death of the Hon'ble Mr V Krishnaswami Iyer, C S I, Member of the Executive Council of His Excellency the Governor of Madras, in whom it has lost one of its most zealous and active supporters, the country one of her best and noblest sons and the British Empire a most loyal and devoted citizen. The Conference authorizes the General Secretary to convey its sincere and heart-felt condolence to the son and relations of the deceased gentleman.

*Moved from the Chair,*

### RESOLUTION III

*Technical Education.*

While expressing its appreciation and thankfulness to the Government for the liberal action taken and contemplated in regard to Technical Education, this Conference once more records its firm conviction that for placing the cause of industrial progress on a firm basis, it is most necessary that the Government should establish in the country at least one fully-equipped Polytechnic College for imparting the highest kind of instruction in the applied sciences and industrial arts and further urges that the visit of Their Imperial Majesties, the King-Emperor and the Queen-Empress should be commemorated by the foundation of such an institution bearing Their names.

Proposed by—Mr. A Chowdhari, (Bengal).

Seconded by—Mr. S K Nair, (Madras)

Supported by—Mr. L. V Kaikini, (Berar).

### RESOLUTION IV

*Failure of Industrial Enterprises.*

This Conference notes with regret and concern the failure of several industrial enterprises started for carrying on new



industries and the effect these failures have produced in damping the ardour of the people in the development of the resources of the country. The Conference calls upon the leaders of the people in the different Provinces and Districts to institute inquiries into the causes of these failures and authorises the General Secretary to depute one or more persons for securing this investigation.

Proposed by—The Hon'ble Mr. R. P. Karandikar,  
(Bombay).

Seconded by—Rao Bahadur V. R. Pandit, (C. P.)

Supported by—Mr. K. S. Narain Rao, (Madras).

#### RESOLUTION V.

##### *Railway Rates*

This Conference calls the attention of the Government to the prevailing complaints about the anomalous character of the existing Railway rates on goods and their unfairly heavy incidence on inter-provincial trade and urges the necessity of laying down for inter-provincial consignments the same scales of rates as those for consignments to and from important ports

Proposed by—Mr N. A. Dravid, (Berar).

Seconded by—Mr. L. V. Kaikini, (Berar).

#### RESOLUTION VI

##### *Purchase of Government Stores*

This Conference urges upon the leaders of the different Provinces the necessity of vigilance to secure the effectual and complete carrying out of the orders of the Government issued in 1909 for the purchase of Government Stores in this country as far as practicable, and appoints a Committee consisting of the following gentlemen to watch the operation of the rules and to report thereon to the next Conference.—

Sir R. N. Mookerjee.

Mr. D. E. Wacha.

Hon'ble Sir Vithaldas D. Thackersey.

Hon'ble Mr. Lalubhai Samaldas.

Dewan Bahadur P. Rajaratna Mudaliyar.

Lala Harkishen Lal.

The Hon'ble Rao Bahadur R. N. Mudholkar.

Proposed by—The Hon'ble Rao Bahadur R. N.

Mudholkar, (Berar)

Seconded by—Prof R. K. Mookerjee, (Bengal).

#### RESOLUTION VII

##### *Directors of Industries*

This Conference once more urges that there should be in every Province of British India, a department of Industry under a Director of Industries to deal with industrial questions and to be in charge of Technical and Commercial education as well as industrial instructions, and that there should be an advisory board of qualified persons not less than one-half of whom should be non-official Indians, who should be consulted on all matters of importance, that the functions of this department should include (1) the supply of advice in regard to new industries, (2) the introduction of new or improved methods and processes, (3) the carrying out of investigation and experiments, (4) the development of selected industries, (5) the organisation of industrial and commercial exhibitions.

(6) That there should be an Industrial Museum and a bureau of information under the Department of Industry for supply of information to the public on industrial and commercial matters

Proposed by—Mr C. Y. Chintamani, (U. P.)

Seconded by—Mr Kalooram Gangrade, (Central India).

#### RESOLUTION VIII

##### *Co-operative Banks.*

This Conference welcomes the establishment in the Bombay Presidency of a Central Co-operative Bank and urges upon the Government and the people the desirability of establishing similar Banks in the other Provinces to help Co-operative Credit Societies and to advance loans directly to agriculturists at reasonable rates of interest

Proposed by—The Hon'ble Sir Gangadhar Rao Chitnavis, (Berar)

Seconded by—Rao Bahadur G. Srinivasa Rao, (Madras).

#### RESOLUTION IX.

##### *Indentured Labour*

This Conference is of opinion that in the highest interests of the country, the system of Indian indentured labour is undersirable and should be abolished and urges the

Government of India to take early steps to prohibit the recruitment of Indian labour under contract of indenture, whether for service at home or abroad.

Proposed by—Hon'ble Mr N Subba Rau, (Madras)

Seconded by—Mr Polak, (South Africa)

Supported by—Mr Paul Peter Pillai, (Madras)

#### RESOLUTION X

##### *Duty on Alcohol*

In view of promoting and facilitating the work of Scientific and Technical Instruction in India, this Conference urges upon Government the desirability of exempting in conformity with the practice of other civilized countries, from payment of duty all alcohol purchased by public educational institutions in this country for strictly educational purposes

Proposed by—Mr Manindra Nath Banerjee, (Bengal).

Seconded by—Dr A Chattopadhyaya, (Bengal).

#### RESOLUTION XI

##### *Appointment of Committee*

This Conference appoints a Committee of the following gentlemen to submit opinions on and offer suggestions in regard to the Co-operative Credit Societies' Bill, the Life Assurance Companies' Bill and the Provident Societies' Bill, now pending in the Imperial Legislative Council —

The Hon'ble Mr G K Gokhale

The Hon'ble Sir Vithaldas D Thackersey.

The Hon'ble Mr M B Dadabhoy

Sir G M Chitnavis

Babu Surendranath Thakur

The Hon'ble Rao Bahadur R N Mudholkar

Proposed by—Mr J Chowdhri, (Bengal)

Seconded by—Pandit Gokarna Nath Misra, (U P)

Supported by—Mr A C Ukil, (Bengal)

#### RESOLUTION XII

##### *Previous Resolutions*

This Conference confirms the resolutions passed in previous Conferences —

(1) calling upon the Government and the people (a) to encourage and help Indian manufacturers and (b) to foster and encourage the use of such manufactures,

(2) inviting the attention of capitalists in India to the urgent need of developing and fully utilising the mineral resources of the country and asking them to make organised efforts in that direction ,

(3) urging the special claims to consideration of the Textile and Sugar Industries, and praying for the repeal of excise duty on cotton goods ,

(4) urging the desirability of the standardisation and unification of weights and measures so as to remove the serious inconveniences caused to trade by their multiplicity ;

(5) urging the Indian Universities to create faculties of Commerce, to institute degrees in Commerce and to affiliate Commercial Colleges which will prepare candidates for such degrees, and recommending the establishment of a College of Commerce in each Provincial Capital, which should also provide for the training of teachers for Commercial Schools in the mofussil.

Proposed by—Mr R. C Bonnerjee (Bengal).

Seconded by—Mr V V Jogiah, (Madras).

#### RESOLUTION XIII.

##### *Office-Bearers*

The Hon'ble Rao Bahadur R N Mudholkar be appointed General Secretary of the Industrial Conference for the next year, Mr N A Dravid, Honorary Assistant Secretary and Mr M B Sant, Assistant Secretary and this Conference appeals to the public for a sum of Rs 5,000 to carry on the work of the Industrial Conference

This Conference deems it desirable that there should be a Standing Committee of the Conference appointed for each year to co-operate with the General Secretary in carrying on the work of the Conference during the year and to advise on all such matters as the General Secretary may submit to them and that the following gentlemen do constitute the Standing Committee for the year 1912 —

Sir R N Mukerji

Mr. J Chaudhari

Sir Vithaldas D Thackersey.

Mr D E Wacha

Hon'ble Mr Lalubhai Samaldas

Dewan Bahadur P Rajaratna Mudaliyar.

Lala Harkishen Lal,

Dr Satish Chandra Banerjee.

Mr. C. V. Chintamam.

Mr Hasan Imam.

Rai Purendu Narayan Sinha.

The Hon'ble Mr M B Dadabhoy.

Hon'ble Rao Bahadur R N. Mudholkar, General Secretary (*Ex-officio*).

Proposed by—The Hon'ble Pandit Madan M. Malaviya.

Seconded by—Rao Bahadur R G. Mundle.

M. B. DADABHOY,

*President,*

*Seventh Indian Industrial Conference.*

R. N. MUDHOLKAR,

*General Secretary,*

*Indian Industrial Conference.*

## Resolutions Passed at the Eighth Indian Industrial Conference.

*Held at Bankipore, on Monday, the 30th December 1912.*

### RESOLUTION I.

#### *The Delhi Outrage.*

The Indian Industrial Conference expresses its indignation and abhorrence at the dastardly outrage committed upon the life of His Excellency the Viceroy and begs to offer its respectful sympathies to Their Excellencies Lord and Lady Hardinge and the Conference fervently prays that His Excellency will have a speedy recovery and restoration to health.

*Moved from the Chair.*

### RESOLUTION II.

#### *Agriculture and Commerce.*

In view of the great importance of properly developing Agriculture and Indian Commerce, this Conference urges upon Government and the people the urgent necessity of establishing Chairs of Agriculture and Commerce for spreading knowledge of the general principles of these subjects

among persons who do not wish to specialise in them ; and for the suitable advancement of Technical Education, the Conference strongly advocates the creation of Boards constituted on lines similar to the Senates of Universities for directing and regulating instruction therein

*Proposer*—Hon'ble Rao Bahadur R. N. Mudholkar.

*Seconder*—Hon'ble Babu Krishna Sahay.

#### RESOLUTION III.

##### *Indian Chambers of Commerce*

This Conference draws the attention of the commercial and other business classes

(a) to the great necessity of establishing Indian Chambers of Commerce and Associations of the Industrial and Financial interests, wherever favourable circumstances exist and

(b) to the importance to themselves and to the country of their engaging to a greater extent than hitherto, in the foreign trade of the country.

*Proposer*—Mr L V Kalkini.

*Seconder*—Dr S. V. Ketkar

#### RESOLUTION IV.

##### *The Atkinson—Dawson Inquiry.*

This Conference expresses its disappointment at the recommendations made by Lieutenant-Colonel Atkinson and Mr Dawson in regard to higher Technical Education and expresses its disagreement with their recommendations in regard to the State Technical Scholarships, as these recommendations are not calculated to secure that higher type of knowledge of principles and practice, which is required for organisation, direction and management of industries.

*Proposer*—Mr. N. A. David.

*Seconder*—Mr M B Sant.

#### RESOLUTION V.

##### *Polytechnic College.*

While expressing its appreciation and thankfulness to the Government for the liberal action taken and contemplated, in regard to Technical education, this Conference once more records its firm conviction that for placing the cause of industrial progress on a firm basis, it is most necessary that the Government should establish in the country at least

one fully-equipped Polytechnic College for imparting the highest kind of instruction in the applied sciences and industrial arts.

*Proposer*—Hon'ble Babu Dwarkanath.

*Seconder*—Mr. Mithila Saran Sinha.

#### RESOLUTION VI.

##### *Technical Education*

This Conference urges all Provincial Governments and administrations, Rulers of Indian States, as well as Principals and Superintendents of Private or Aided Schools and Colleges, to add Commercial, Technical and Industrial classes for instruction in commercial subjects as well as in weaving, dyeing, sheet-metal working, smithy, carpentry, etc., to the existing courses of instruction, wherever practicable.

*Proposer*—Mr Moulvi Mahamad Hussain.

*Seconder*—Mr Chandrabhan Sahay.

*Supporter*—Mr G. N. Kane.

„ Mr. G K Harkare.

#### RESOLUTION VII

##### *Failure of Industrial Enterprises*

This Conference notes with regret and concern the failure of several industrial enterprises started for carrying on new industries and the effect these failures have produced in damping the ardour of the people in the development of the resources of the country. The Conference calls upon the leaders of the people in the different Provinces and Districts to institute inquiries into the causes of these failures and to communicate to the General Secretary the results of their inquiries, and authorises the General Secretary to depute one or more persons for conducting this investigation, if the funds at his disposal permit.

*Proposer*—Professor Jadunath Sarcar.

*Seconder*—Rai Narayan Prasad Sahib.

*Subborters*—Mr. K. P. Sen Sinha.

„ Rao Saheb Ganesh Nagesh.

#### RESOLUTION VIII

##### *Hand-Loom Weaving.*

This Conference specially invites the attention of the capitalists to the great and urgent necessity of improving the existing condition of the Weaving industry by the introduction of labour-saving hand-loomis and other devices of

approved patterns, in important centres of the hand-loom weaving industry, with the co-operation of the weaving classes.

*Moved from the Chair.*

#### RESOLUTION IX

##### *Railway Rates.*

This Conference once more calls the attention of the Government to the prevailing complaints about the anomalous character of the existing Railway rates on goods and their prejudicial effect on interprovincial trade, and urges the necessity of laying down, for interprovincial consignments, the same scales of rates as those for consignments to and from important ports.

*Moved from the Chair.*

#### RESOLUTION X

##### *Faculty of Commerce.*

This Conference records its sense of gratitude to the Government of Bombay for having created a Faculty of Commerce and urges the other local Governments and Universities in India to follow the example of the Bombay University in establishing Faculties of Commerce for giving an impetus to Commercial Education.

*Moved from the Chair.*

#### RESOLUTION XI.

##### *Provincial Departments of Industry.*

This Conference once more urges that

- (a) There should be in every province of British India, a Department of Industry under a Director of Industries to deal with purely industrial questions and to be in charge of Technical, Commercial as well as Industrial Education of the Province; and that there should be an advisory board of qualified persons, not less than one half of whom should be non-official Indians, who should be consulted on economic questions of importance; that the functions of this department should include (1) the introduction of new or improved methods and processes, (2) the carrying out of investigations and experiments, (3) the development of selected industries and (4) the organisation of industrial and commercial Exhibitions.



- (b) That there should be an Industrial Museum and bureau of information under the Department of Industry for supply of information and advice to the public on all Industrial and Commercial matters within the province.

*Proposer*—Hon'ble Mr Gokuldas K. Parekh.

*Seconder*—Babu Ram Gopal Choudhary.

#### RESOLUTION XII.

##### *Co-operative Banks.*

This Conference once more welcomes the establishment in the Bombay Presidency of a Central Co-operative Bank and urges upon the Government and the people of other Provinces, the need of establishing similar Banks to help the existing Co-operative Credit Societies for advancing loans at reasonable rates and on easy terms to the agriculturists.

*Proposer*—Rai Purnendu Narayan Sinha Bahadur.

*Seconder*—Mr. L. V. Kaikini

#### RESOLUTION XIII.

##### *Miscellaneous.*

This Conference confirms the resolutions passed in previous years —

- (1) Calling upon the Government and the people (a) to encourage and help Indian manufactures and (b) to foster and encourage the use of such manufactures ;
- (2) Recommending to the people the desirability of starting Funds for the promotion of Technical and Industrial Education ;
- (3) Inviting the attention of capitalists in India to the urgent need of developing and fully utilising the mineral resources of the country and asking them to make organised efforts in that direction ;
- (4) Urging upon the attention of the Imperial Government the special claim to consideration of the Textile and Sugar Industries ; and praying for the repeal of the excise duty on cotton goods ;
- (5) Urging upon Government the desirability of the standardisation and unification of weights and measures so as to remove the serious inconveniences caused to trade by their multiplicity.

*Proposer*—Mr. Mathura Nath Sinha.

*Seconder*—Mr. S. V. Lalit.

## RESOLUTION XIV.

*Co-operative Credit Societies*

This Conference expresses its great satisfaction at the progress which Co-operative Credit has made in this country since the passing of the Co-operative Credit Societies' Act of 1904, and earnestly hopes that with the wider application of the principle of co-operation under the Co-operative Societies' Act of 1912, Government will give larger financial and administrative facilities which are needed to secure a surer growth of co-operation and exhorts the educated public to strenuously extend its operations to various branches of agriculture and small industries which are bound to prosper with the help of the co-operative movement.

*Proposer*—Mr. G. K. Devadhar.

*Seconder*—Mr. R. V. Mahajan.

## RESOLUTION XV.

*Sir T. Palit's Gift*

This Conference places on record its sense of gratitude to Sir T. Palit of Calcutta for his munificent gift to the Calcutta University and expresses the hope that his example would be followed by others.

*Moved from the chair.*

## RESOLUTION XVI.

*Office Bearers*

The Hon'ble Rao Bahadur R. N. Mudholkar be appointed General Secretary of the Indian Industrial Conference for the next year, Mr N. A. Dravid, Honorary Assistant Secretary and Mr M. B. Sant, Assistant Secretary and this Conference appeals to the public for a sum of Rs 8,000 to carry on the work of the Industrial Conference.

This Conference deems it desirable that there should be a Standing Committee appointed for each year to co-operate with the General Secretary in carrying on the work of the Conference during the year and to advise him on all such matters as he may submit to them and that the following gentleman do constitute the Standing Committee for the year 1913 :—

Sir R. N. Mookerji.

Lala Harkishen Lal.

Mr J. Chaudhari

Sir Vithaldas D. Thackersey.

Mr D. E. Wacha

Hon'ble Mr. Lalubhai Samaldas.

Diwan Bahadur P. Rajaratnam Mudaliyar.  
 Dr. Satish Chandra Banerjee.  
 Mr. C. Y. Chintamani  
 Rai Purnendu Narayan Sinha Bahadur.  
 Hon'ble Mr. M. B. Dadabhoy.  
 Hon'ble Babu Krishna Sahay.  
 Hon'ble Rao Bahadur R. N. Mudholkar (*Ex-officio*).  
*Proposer*—Hon'ble Mr. Krishna Sahay  
*Seconder*—Professor Jogindra Nath Samaddar.

HARKISHEN LAL,

*President,*

*Eighth Indian Industrial Conference.*

R. N. MUDHOLKAR,

*General Secretary.*

*Indian Industrial Conference.*

## Resolutions Passed at the Ninth Indian Industrial Conference.

*Held at Karachi on Thursday, the 25th December, 1913.*

### I INDIAN BANKS.

RESOLVED—With reference to the questions raised by the Government of India on which opinions are invited as to whether there should be restrictions about the use of the terms "Banks" and "Bankers" and as to whether there should be any legislation in regard to banking, this Conference is of opinion

(a) That the use of the term "Bank" should be restricted only to companies registered under the Joint Stock Companies' Act.

(b) That all Banks not registered in British India having an office or Branch in British India should be registered under the Indian Companies Act, save and except the Banks which are created by a Statute ;

(c) That there need be no subscribed minimum capital but that the paid up capital should be one-third of the subscribed capital and that it should be paid up within six months of registration,

(d) That the Registrar of the Joint Stock Companies be authorized to refuse to register as Banks such companies whose Memoranda of Association provide for and warrant

business other than Banking business in the ordinary sense of the term and that an appeal against the Registrar's decision should be allowed to the highest judicial authorities of the place where the Registrar's Office is situated ;

(e) That no Bank shall be allowed to use the terms " Saving's Bank " for a department, or a concern except the Presidency Banks and Government Postal Department, unless the said Department or the said concern is made to invest two-thirds of deposits in securities sanctioned by the Indian Trusts Act and ear-marked for that purpose ,

(f) No Banks shall be allowed to advance monies against their own shares, unless they are fully paid up

*Proposed*—Mr D E Wacha

*Seconded by*—Rao Bahadur Dewan Hiranand Khemsing

*Supported by*—Rao Bahadur R N Mudholkar.  
Messrs P. D Shamdasani and C. P Ramaswamy Iyer.

## II CONGRESS OF COMMERCE

**RESOLVED**—This Conference welcomes the scheme of the proposed All-India Commercial Congress, formulated by the Hon'ble Sir Fazulbhoy Currimbhoy Ebrahim as affording an unmistakable proof that the leaders of the Commercial and Industrial community are awakening to the need of organising their interests so as to develop greater solidarity of influence and opinion and to be better able to represent with weight and authority the Indian point of view in the councils of the commercial world of India and the Empire. It appoints a committee consisting of the following gentlemen to consider and report as to how this Conference can best co-operate with the proposed All-India Commercial Congress in advancing the objects, which it is intended to promote.—

Mr D E Wacha

Rao Bahadur R N Mudholkar.

Hon'ble Mr Laluohai Samaldas.

Hon'ble Sir Fazulbhoy Currimbhoy.

Sir R, N. Mookerji.

Mr J Chowdhury

Hon'ble Babu Ganga Prasad Varma.

Mr C. Y Chintamani

Mr N Subba Rau

Dewan Bahadur P. Rajaratna Mudahyar.

Mr. Gulam Hussain G. Chagla.

Mr Usufali

Lala Lajpatrai

Hon'ble Rai Bahadur Lala Sultan Singh, (Delhi).

*Proposed by*—Mr Jehangir Bomanji Petit

*Seconded by*—Hon'ble Sir Fazulbhoy Currimbhoy.

*Supported by*—Lala Goverdhandas

### III. CO-OPERATION AMONG INDIAN CHAMBERS OF COMMERCE.

*Resolved*—The Conference calls upon all persons taking genuine interest in the advancement of Indian industries—

(1) To bring about co-operation and co-ordination between the existing Indian Chambers of Commerce, Trades Associations, Mercantile Unions and Industrial Associations.

(2) To establish such Chambers and Associations at important commercial and industrial centres, where none such are in existence and for this purpose to widen the scope and enlarge the working of the Industrial Conference.

*Proposed by*—Mr C Y. Chintamani.

*Seconded by*—Lala Lajpatrai

*Supported by*—Mr. C Gopal Menon.

### IV. WEIGHTS AND MEASURES.

*Resolved*—This Conference notes with satisfaction the appointment by the Government of India of a Committee to enquire into the question of Weights and Measures and expresses the hope that as a result of the enquiries of the Committee, suitable action will be taken for securing uniformity of weights and measures.

*Proposed by*—Mr J Chowdhury

*Seconded by*—Mr. Gopaldas Jhamatmal.

### V. APPRENTICES.

*Resolved*—This Conference brings to the notice of Government that in order to encourage enlistment of apprentices by factories carrying on new industries, it is desirable to amend Section 27 of the Indian Contract Act so as to permit agreements laying down reasonable limitations and conditions under which an apprentice may, after the expiry of his period of apprenticeship, establish, carry on or perform work in or for another factory.

*Proposed by*—The Hon'ble Mr Gokuldas K Parekh

*Seconded by*—The Hon'ble Mr T V. Sheshagiri Aiyar.

*Supported by*—Mr. Shrikishendas.

## VI. OMNIBUS RESOLUTION.

*Resolved*—This Conference while recording its appreciation of the provision which Government have been making for Agricultural and Commercial education and for technical education generally, deems it necessary to re-affirm resolutions II, IV, VI, X and XIII of the last conference in regard to the measures which have to be adopted for making such Provision adequate to the requirements of the country This conference re-affirms the resolutions passed at the last conference and at previous Conferences in regard to (a) Handloom Weaving, (b) Provincial Departments of Industry, (c) Co-operative Banks, (d) Co-operative Credit Societies and (e) Railway Rates.

*From the Chair*

## VII GIFT OF DR RASH BEHARI GHOSH.

*Resolved*—This Conference places on record its grateful appreciation of the munificent gift made by Dr Rash Behari Ghosh to the Calcutta University and appeals to other wealthy gentlemen in the country to follow his example.

*Proposed by*—Mr G. K. Deodhar.

*Seconded by*—Mr Ayubkhan of Las Bela.

## VIII. OFFICE BEARERS.

*Resolved*—This Conference resolves that Rao Bahadur R. N. Mudholkar be appointed General Secretary of the Indian Industrial Conference for the next year, and Mr. M. B. Sant, Assistant Secretary, and this Conference appeals to the public for a sum of Rs. 8,000 to carry on the work of the Industrial Conference

This Conference deems it desirable that there should be a Standing Committee appointed for each year to co-operate with the General Secretary in carrying on the work of the Conference during the year and to advise him on all such matters as he may submit to them and that the following gentlemen do constitute the Standing Committee for the year 1914 :—

Sir R. N. Mookerjee, (Bengal).

Mr J Chowdhury. „

Hon'ble Mr Lalubhai Samaldas, (Bombay).

Sir Vithaldas D Thackersey, *Kt.* „

Mr. D E. Wacha, „

Dr. Satish Chandra Banerjee (U. P. and Oudh).

Mr C. Y Chintamani, „

Dewan Bahadur P. Rajaratna Mudahar, (Madras).

Lala Harkishen Lal (Punjab).

Honorable Rai Purnendu Narain Singh Bhadur, (Bihar).

Honorable Rai Bahadur Krishna Sahay, (Bihar).

Rao Bahadur Dewan Hiranand Khemsing, (Sind).

Mr M. B. Dadabhoy, (C. P.).

Rao Bahadur R. N. Mudholkar, (*Ex-Officio*).

*Proposed by*—Hon'ble Dewan Bahadur L. A. Govindaraghava Iyer.

*Seconded by*—Hon'ble Dr. Nil Ratan Sircar.

LALUBHAI SAMALDAS,

*President,*

*Ninth Indian Industrial Conference.*

R. N. MUDHOLKAR,

*General Secretary,*

*Indian Industrial Conference.*

### **Resolutions passed at the Tenth Indian Industrial Conference**

*Held at Madras on the 26th and 27th December 1914.*

#### **RESOLUTION I.**

*Loyalty to the King Emperor.*

This Conference, consisting of representatives of the industrial, commercial and agricultural interests of the land and of all classes and communities working for the material advancement and economic development of the country, respectfully begs to convey to His Imperial Majesty, King George V, the humble message of the people of India of their unswerving loyalty and deep devotion to their beloved Emperor and the British throne and their cheerful and willing readiness to co-operate with the rest of the Empire to secure victory for the Imperial arms in this titanic struggle for the vindication of national honour, of the sanctity of international treaties and obligations and for upholding the freedom of small and oppressed nations.

*Moved from the Chair.*

#### **RESOLUTION II.**

*Sympathy with H. E. The Viceroy.*

This Conference respectfully conveys its condolence to His Excellency Lord Hardinge, our Viceroy, on the loss

sustained by him in the death of his gallant son, the Hon'ble Lieut E C Hardinge and authorises the President to convey the same by wire to H E the Viceroy.

*Moved from the Chair.*

#### RESOLUTION III

##### *Technical Education.*

This Conference urges the Local Governments and Administrations in India to establish trade schools and continuation classes for the training and education of the workmen, in all important industrial centres of each Province and a superior technological college for each province for the training of foremen and apprentices.

(2) This Conference also requests the Government of India to establish one fully equipped first class college of Technology for all India and develop the Tata Research Institute at Bangalore for the purpose

(3) This Conference calls upon Indian Capitalists and Managers of Indian factories and Industrial Institutions to help young Indians technically trained in finding practical training and employment

(4) This Conference recommends the establishment of a public polytechnic institute on the lines of the London polytechnic.

*Proposed by*—Professor N. D. Daru, (Madras).

*Seconded by*—Dr C S Thakore (Bombay).

*Supported by*—Messrs S K Nair, (Travancore), Mr, K. V Hanumantha Rao, (Masulipatam) and V. V. Jogiah, (Berhampore).

#### RESOLUTION IV.

##### *District Board Railways.*

This Conference desires to record its opinion that in the development of the country by means of railways and irrigation projects, the funds available in the hands of the State should chiefly be devoted to the latter and that a portion of the funds set apart for the former should be utilized to aid the resources of the local bodies whose enterprise in the direction of the construction of branch feeder lines and similar projects should be promoted by Government, wherever possible, in preference to that of private capitalists.

This Conference is grateful that the Government of India has recognised the desirability of the Local Boards constructing and owing branch and feeder lines of railways and respectfully urges on the Government the need for helping



them to find the necessary funds as urged by the Madura District Board

Proposed by—Hon'ble Mr K Ramieyengar, (Madura).

Seconded by—Mr C Karunakar Menon, (Cal cut).

Supported by—Messrs A Rangaswamy Aiyai, (Madura).  
T, A Ramalinga Chettiar, (Coimbatore) and A. P Patro,  
(Berhampore)

#### RESOLUTION V

##### *Revival of Industries.*

(1) This Conference desires to record its opinion (i) that in view of the need, as disclosed by the war, of providing not only for the industrial efficiency of the British Empire as a whole but also of making India more self-supporting and less dependent than she has been on foreign countries in regard to her economic needs, it is necessary that the fiscal policy of the country should be directed to promoting the growth of manufactures and the creation of an industrial regime side by side with the development of agriculture and the exploitation of raw material, (ii) that for this purpose it is necessary (a) that the representatives of the people should obtain fiscal autonomy in regard to the imposition of duties both on exports and imports, (b) that the State should aid the starting and pioneering of new industries through the establishment of a department of Government for the purpose, (iii) that Government should, simultaneously with a policy of introducing free primary education—also impart technical, industrial and commercial education and hereby reiterates the resolutions passed at the previous Conferences for the establishment of technological institutes, industrial and commercial schools

(2) This Conference urges more particularly the following measures in this connection —

(a) That the several Governments, Provincial and Imperial, do co-ordinate and complete the sporadic efforts so far made to have a complete industrial survey of the country.

(b) That Government should help in the present efforts for the starting and revival of industries by declaring its willingness to instruct its scientific and technical officers to investigate problems confronting organisers of industries and to give advice

Proposed by—Hon'ble Sri K R V Krishna Rao Bahadur, (Cocanda)

Seconded by—Professor V. G Kale, (Poona).

Supported by—Mr. Yakub Hasan Sait (Madras).

## RESOLUTION VI

*Co-operative Audit fees*

This Conference is of opinion, (1) that the Government should continue as at present, free of cost, to exercise, through their officers, the functions of audit and inspection of co-operative credit societies in this country till they are thoroughly and efficiently organised, into central unions, to take up these duties themselves, that, Government should maintain an adequate and trained staff for this purpose and (ii) that, in view of the deplorable condition of the artisan and industrial and labouring classes of the populations, special officers should be appointed under the co-operative department in the various provinces, to establish suitable co-operative institutions for their benefit

Proposed by—Rao Bahadur T. S. Balakrishna Aiyer, (Coimbatore).

Seconded by—Rao Saheb V. A. Parthasaradhy Mudelliar, (Madras)

Supported by—Mr. G. K. Devadhar, (Poona).

## RESOLUTION VII

*Cottage Industries*

This Conference desires to record its opinion that it is necessary in the interests of the present and prospective economic well-being of the country that efforts should always be directed towards starting and resuscitating the various minor and cottage industries to form an adjunct to the economic resources of a people mainly agricultural and recommends the improvement of the existing condition of the hand-weaving industry by the introduction of labour-saving appliances and other devices of approved pattern in important centres of the hand-loom industry with the co-operation of the weaving classes and the organisation of peripatetic weaving demonstration parties.

Proposed by—The Hon'ble Mr. K. Chidambaranatha Mudelliar, (Shyali).

Seconded by—Mr. V. Devasigamani Pillai, (Hyderabad, Deccan)

Supported by—Mr. S. Satyamurthi, (Madras).

## RESOLUTION VIII

*Indian Commercial Attaches.*

This Conference is of opinion that Indian Commercial Attaches should be appointed to the British Consulates

outside British India to look after Indian Commercial interests

Proposed by—Mr J. K. Metha, (Bombay).

Seconded by—Mr. Yakub Hussain Sait, (Madras).

#### OMNIBUS RESOLUTION IX.

This Conference confirms the resolutions passed in previous Conferences —

(1) Calling upon the Government and the people (a) to encourage and help Indian manufactures and (b) to foster and encourage the use of such manufactures

(2) Inviting the attention of capitalists in India to the urgent need of developing and fully utilising the mineral resources of the country and asking them to make organised efforts in that direction.

(3) Urging the special claims to consideration of the Textile and Sugar Industries, and praying for the repeal of the excise duty on cotton goods

(4) Urging the desirability of the standardisation and unification of weights and measures so as to remove the serious inconvenience caused by their multiplicity

(5) Urging the Indian Universities to create faculties of commerce, to institute degrees in commerce and to affiliate commercial colleges which will prepare candidates for such degrees, and recommending the establishment of a college of commerce in each Provincial Capital, which should also provide for the training of teachers for commercial schools in the mofussil.

(6) Bringing about co-operation and co-ordination between the existing Indian Chambers of Commerce, Trades Associations, Mercantile Unions and Industrial Associations

*[Moved from the Chair]*

#### RESOLUTION X.

##### *Constitution of the Conference*

This Conference is of opinion that the time has arrived for providing a working organisation for the Industrial Conference at all provincial centres and for improving the constitution of the Conference so as to provide for working offices in all the provinces to carry on the work of the Conference, throughout the year and hereby suggests for consideration the following constitution and instructs a Committee

consisting of the following gentlemen to scrutinise the same and place it for adoption before the next Conference —

1 The objects of the Indian Industrial Conference shall be attained —

(1) by the holding of an Annual Conference on Industries and Industrial progress in India

(2) by the establishment of Standing Provincial committees for the co-ordination of efforts directed to the promotion of Industrial progress under a Central Committee

(3) by the publication of periodical bulletins and reports on the work done and results achieved every three months, and by such other means as may be deemed advisable.

2 The Standing Committee of the All India Industrial Conference shall consist of (1) the President of the previous Conference, (2) the Secretary and Assistant Secretary, the Treasurer, if necessary, of the Conference and the Secretaries of the Provincial Committees. The duty of carrying on the work of the Conference shall vest in the said Standing Committee, who shall be placed in possession of funds for the purpose in accordance with these rules

3 The All-India and Provincial Standing Committee may recognise other organisations sympathising with the objects of the Conference on payment of an annual fee of Rs 10, and thereupon the said institutions shall be entitled to elect Delegates to the conferences held by the Provincial and All-India Committees. That the Provincial Standing Committees may arrange for the holding of Provincial and District Conferences and exhibitions from time to time

4 That half the amount of the delegation fees and a further sum to be raised by subscriptions to an amount not exceeding—shall be placed at the disposal of the All-India Standing Committee for carrying on the work now being done by the Secretary on behalf of the Conference and that further amounts may be similarly raised, whenever necessary

5 That an account of the monies received and spent by the All-India Committee shall be rendered by them at the Annual Conference and they shall arrange for its being duly audited and published

6 That the business of the All-India Committees may, if necessary, be transacted by correspondence and by a majority of the votes recorded in each case

7. That the work of holding the Annual Sessions of the Conference and the expenditure in connection therewith shall be performed by Reception Committees organised annually

by the several Provincial Committees of the Provinces where the Conference is to assemble

- 1 Sir, R N Mukerjee, (Calcutta).
- 2 J Chowdhary, Esq., ( „ )
- 3 Rai Seetanath Roy Bahadur, ( „ )
- 4 Purushothamdas Thakurdas, Esq., (Bombay)
- 5 Hon'ble Sir Fazulbhuy Currimbhoy ( „ )
- 6 The Hon'ble Mr Manmohandas Ramji ( „ )
- 7 „ Lalubhai Samaldas, ( „ )
- 8 Rao Bahadur P Theagaroy Chetty, (Madras).
- 9 Yakub Hassan Sait Esq., ( „ )
- 10 C Gopal Menon Esq., ( „ )
- 11 Vidya Sagar Pandya Esq., ( „ )
- 12 C Y Chintamani, Esq (Allahabad).
- 13 Dr Satish Chandra Banerjee, ( „ )
- 14 Mazharul Haque, Esq., (Behar)
- 15 Rao Bahadur Hiranand Khemsing (Sindh).
- 16 Lala Mulkharaj Bhalla Esq., (Punjab)
- 17 Hon'ble Rai Purnendu Narayan Sinh Bahadur,  
(Behar)
- 18 The Hon'ble Mr M B Dadabhoy, (C P )
- 19 The Hon'ble Rao Bahadur R N Mudholkar, (*Ex-*  
*Officio*)

Proposed by—Hon'ble Rao Bahadur Raman Bhai Nilkanth (Ahmedabad).

Seconded by—Mr A Rangaswami Aiyer, (Madras)

Supported by—Hon'ble Rao Bahadur R N Mudholkar,  
and Mr. D V Hanmantha Rao (Bezwada)

#### RESOLUTION XI.

##### *Office Bearers and Standing Committee.*

(a) That the following gentlemen do constitute the Standing Committee for the year 1915 to advise the General Secretary on all matters and to carry on the work of the Conference —

- 1 Sir R N Mukerjee
- 2 J Chowdhary, Esq
- 3 The Hon'ble Mr Manmohandas Ramji.
- 4 „ Mr Lalubhai Samaldas
- 5 „ Mr M B Dadabhoy
- 6 „ Rai Purnendu Narayan Sinh Bahadur.
- 7 „ Rao Bahadur R N Mudholkar, (*Ex-*  
*Officio*)
- 8 Rao Bahadur P Theagaroya Chetty.
- 9 Vidya Sagar Pandya, Esq.
- 10 C. Y. Chintamani, Esq.

- 11 Dr Satish Chandra Bannerjee
- 12 Lala Mulkraj Bhalla
- 13 Rao Bahadur Hiranand Khemsing
- 14 Mazharul Haque, Esq.

(b) That the Hon'ble Rao Bahadur R N Mudholkar be appointed General Secretary of the Indian Industrial Conference for the next year, and Mr M B Sant, Assistant Secretary, and this Conference appeals to the public for a sum of Rs 8,000 to carry on the work of the Conference

Proposed by—Mr C Gopal Menon, (Madras)

Seconded by—Mr Yakub Hassan Sait, ( „ )

MANMOHANDAS RAMJI,

*President,*

*Tenth Indian Industrial Conference*

R N MUDHOLKAR,

*General Secretary,*

*Indian Industrial Conference*

## RESOLUTIONS

PASSED AT

The Eleventh Indian Industrial Conference

HELD AT BOMBAY

On Friday and Saturday, the 24th and 25th December 1915.

### RESOLUTION No 1

LOYALTY TO THE KING EMPEROR

This Conference, consisting of representatives of the Industrial interests of the land, begs respectfully to express its deep and abiding sense of loyalty to His Imperial Majesty the King Emperor and to assure the British Government of the active support and co-operation of all industrial classes in this great war, realising that the peaceful progress of the country and its industries is dependent on the continuance of the British connection

(Moved from the Chair)

### RESOLUTION No 2

DEATHS OF THE HON'BLE MR G K GOKHALE AND THE

HON'BLE SIR P M MEHTA

This Conference places on record its deep grief at the loss the country in general has suffered on its industrial side, through the deaths of the Hon'ble Mr Gokhale and the Hon'ble Sir P M Mehta, both of whom always stood up for the rights and privileges of indigenous industries and for safeguarding their interests

(Moved from the Chair)

## RESOLUTION No 3

## TECHNICAL AND INDUSTRIAL EDUCATION.

- (a) Having regard to the fact that the progress and prosperity of every nation depends in these times on Industrial and Technical Education, this Conference earnestly recommends the establishment of a technological faculty at the principal Indian Universities and the development of Technical Institutions already existing and the opening of new ones and the gradual introduction of technical instruction in primary and secondary schools
- (b) Recognising that no system of Industrial and Technological Education, howsoever developed it may be, can be successful without a sufficient encouragement being given to persons who have received such education, this Conference appeals to men of capital and industry to help young Indians, technically trained, in finding practical work and employment

Proposed by —Dr Haro'd H Mann

Seconded by --Hon'ble Mr Lalubhai Samaldas.

Supported by —Mr N B Vibhakar, Bar-at-Law.

„ „ Mr. G A Natesan

„ „ Pro D D Kanga

## RESOLUTION No 4

## DEVELOPMENT OF INDIAN INDUSTRIES

This conference desires to place on record its opinion that for the well-being of India, it is the duty both of Government and the public to stimulate the old and foster new industries, and while appreciating all that has been done by the Imperial and Provincial Governments in this direction, recommends for the same the following measures —

- (a) That fiscal autonomy should be granted to India in regard to the levying of duties, both on imports and exports
- (b) That where the Departments of Industries do exist, they should be so organised as to effectively assist in the creation and development of industries, and in the Presidencies and Provinces, where they do not exist, they should be established, and that Industrial Advisory Boards be constituted in each province
- (c) That Industrial surveys should be taken of industries possible to be developed in the country

Proposed by —Mr A P Patro (Ganjam)

Seconded by —Mr Jehangir Bomanji Petit

Supported by —Mr S Satyamurthi.

„ „ Rao Saheb Ganesh Nagesh Sahasrabudhe.

## RESOLUTION No. 5.

## EXCISE DUTY

This Conference earnestly urges the repeal of the Excise Duty on cotton goods, which is an inequitable tax and considers it very desirable in the interests of Indian Industries that counter-vailing duties should be levied on bounty-fed and subsidised goods from foreign countries, when they compete to the injury of indigenous industries

Proposed by —Sir Vithaldas D Thakersey

Seconded by —Mr C P Ramaswamy Iyer

Supported by —Mr Rahimtula Currimbhoy

## RESOLUTION No 6

## FAVOURERD NATION TREATMENT

This Conference trusts that in any treaties which may be arranged between the different International powers hereafter, the Imperial Government will arrange that so far as Indian fiscal interests are concerned, India shall be allowed a voice through her own representatives in the settlement and that at any rate, she shall be accorded the most-favoured-nation treatment

Proposed by —Mr Purushotamdas Thackordas

Seconded by —Mr S Shrinivas Iyengar

## RESOLUTION No 7

## INDENTURED LABOUR

This Conference tenders its respectful thanks to H E Lord Hardings, the Viceroy, and the Government of India, for having recommended the abolition of the system of indentured labour to the Rt Hon'ble the Secretary of State for India and, in view of its highly injurious and immoral effects, urges that the system be abolished as soon as possible.

Proposed by —Mr. M K. Gandhi

Seconded by —Mr K N Aiyar Iyer

Supported by —Mr N M Muzumdar

## RESOLUTION No 8

## INDIAN STUDENTS ABROAD

While recognising the efforts made by the Secretary of State for India for better training of Indian technical students in the United Kingdom and on the Continent, this Conference strongly recommends that he should, in placing orders for the Government of India, give preference to such firms, other things being equal which offer facilities to Indian students for practical trainings

Proposed by —Mr J M Mehta, Bar-at-Law

Seconded by —Dr P N, Daruwalla, L L D, Bar-at-Law

Supported by —Mrs Sarojini Naidu

„ „ Dr. Jivraj N. Mehta, M D



## RESOLUTION No 9.

## BRITISH CONSULAR SERVICE AND INDIA

This Conference is of opinion that Indian commercial attaches should be appointed to principal British Consulates to look after Indian commercial interests, and that standing museums of Indian products should be maintained at these consulates and also at London. The conference welcomes the creation of the post of a Trade Commissioner for India in London and hopes that it will be a permanent one held by persons, preferably Indian, fully conversant with Indian Commercial and Industrial conditions

( Moved from the Chair )

## RESOLUTION No 10

## PURCHASE OF STORES

This Conference earnestly urges the Government to purchase all their requirements as far as practicable from this country and to put their resolution of 1909 regarding the same more and more into effect

Proposed by —Mr S E Warden

Seconded by —Mr Bhaskarrao Vithaldas Mehta, Advocate

Supported by —Mr Mathuradas Gokaldas Thacker

## RESOLUTION No 11.

## COTTAGE INDUSTRIES

This Conference is of opinion that it is in the interests of the progress and well-being of the country that efforts should be made both by Government and the public for the starting and reviving of various minor and cottage industries

Proposed by —Dr C S Thakore

Seconded by —Mr S S Mehta

Supported by—Mr Rangan

## RESOLUTION No 12

## STANDING EXHIBITIONS OF FOREIGN AND INDIGENOUS GOODS

This Conference, while welcoming the principle, introduced by the Commercial Department of the Government of India, of holding Exhibitions at principal cities in India, begs to suggest that there should be Standing Exhibitions of this nature at all the Presidency towns and important trade centres

Proposed by —The Hon'ble Mr Lalubhai Samaldas, C I E

Seconded by —Mr C N Pandya, B A. L L B

## RESOLUTION No 13

## INDUSTRIAL BANKS

This Conference is of opinion that as systematic development of industries cannot be carried on without sound financial aid and proper guidance, it is necessary to make effort for the establishment of Industrial Banks, similar to those found in foreign countries.

Proposed by.—The Hon'ble Mr Manmohandas Ramji

Seconded by —Mr K H Vakil

## RESOLUTION No 14

That in regard to the constitution proposed at Madras, it is resolved that the following Committee should be appointed to draft the constitution of the Indian Industrial Conference and report not later than the 31st March 1916

- 1 The Hon'ble Mr Lalubhai Samaldas, Bombay
  - 2 Sir Vithaldas D Thakersey, Kt Bombay
  - 3 The Hon'ble Pandit Madan Mohan Malaviya, Allahabad
  - 4 Mr. C Y Chintamani, Allahabad
  - 5 Hon'ble Rao Bahadur R N Mudholkar (*Ex-officio*), Amraoti
  - 6 Mr Vidya Sagar Pandya, Madras
  - 7 Mr J K Mehta, Bombay
  - 8 Mr J Chowdhury, Bar-at-Law, Calcutta
  - 9 Dewan Bahadur L A Govindaraghava Iyer, Madras
  - 10 Mr C P Ramaswamy Iyer, Madras
- ( Moved from the Chair )

## RESOLUTION No 15

## APPOINTMENT OF OFFICE BEARERS

That the following gentlemen do constitute the Standing Committee for the year 1916 to advise the General Secretary on all matters and to carry on the work of the Conference and that the Hon'ble Rao Bahadur R N Mudholkar be appointed General Secretary of the Indian Industrial Conference and Mr M B Sant, Asst Secretary, and this Conference appeals to the public for a sum of Rs 8,000 to carry on the work of the Conference

- 1 Sir Dorabji J Tata Kt , Bombay
- 2 The Hon'ble Mr Manmohandas Ramji, Bombay
- 3 Hon'ble Mr Lalubhai Samaldas, C I E Bombay
- 4 Sir R N Mookerjee, K C I E , Calcutta
- 5 Mr J Chowdhury, Calcutta
- 6 Hon'ble Rao Bahadur R N Mudholkar, C I E , (*Ex-officio*)  
Amraoti
- 7 Hon'ble Mr M B Dadabhoy, C I E , Nagpur
- 8 Hon'ble Rai Purnendu Narayan Singh Bahadur, Bankipore
- 9 Mr Mazharul Haque, Bankipore
- 10 Mr S Srinivas Iyengar, Madras
- 11 Mr C Gopal Menon, Madras
- 12 Lala Harkishen Lal, Lahore
- 13 Mr C. Y Chintamani, Allahabad
- 14 Mr Alakh Dhari, Amritsar

Proposed by —Mr C Gopal Memon

Seconded by —Hon'ble Mr Manmohandas Ramji

DORABJI J TATA,

*President*

*Eleventh Indian Industrial Conference*

R N MUDHOLKAR,

*General Secretary*

*Indian Industrial Conference.*



## APPENDIX II

### *List of delegates to the twelfth Indian Industrial Conference*

HELD AT LUCKNOW ON 30TH DECEMBER 1916

*(1) Elected by the Indian Economic Society, Bombay*

- 1 J B Petit, Esqr
- 2 Shet Govind Pettie
- 3 The Honourable Sir Ibrahim Rahimtulla, Kt
- 4 R R Nabai Esqr, B A
- 5 Shet Ruttonsey Dhaamsey
- 6 N M Muzumdar Esqr, B A B sc (London)
- 7 Jamnadas D Dhaamsey Esqr, B A
- 8 D F Cama, Esqr
- 9 Baban Gokhale Esqr
- 10 The Honorable Mr C V Mehta, M A, LL B
- 11 M. R. Jayakar, Esqr M A, LL B, Bai-at-law
- 12 G K Devadhar Esqr M A
- 13 Shankailal Ghelabhai Bankei, Esqr M A
- 14 J R Gharpure Esqr B A, LL B
- 15 N. V Goghale, Esqr, M A, LL B
- 16 Omar Sobani Esqr
- 17 Motilal Vollabhji, Esqr
- 18 Di S M Sane
- 19 M. D Altekai, Esqr, B A,
- 20 Umar Sobani Esqr.
- 21 Hansaraj P. Thackersey Esqr
- 22 Lala Shankar Haiprasad Esqr
- 23 Balubhai T Desai, Esqr, B A, LL B
- 24 Mavji Govindji Sheth, Esqr
- 25 Ishwardas Ichharam Mashruwala, Esqr B A
- 26 Dr V. N Bhajekai
- 27 Yeshwant Rao Govind Gujari, Esqr
- 28 N B. Vibhakai, Esqr, Bai-at-law

- 29 T A Kulkarni Esqr
- 30 G. N. Potdar, Esqr
- 31 H. S Spencer, Esqr B A
- 32 Prof V G Kale, M A
- 33 Chandrashankar Naimdashankar Pandya, Esq , B. A ,  
LL B
- 34 Prof Keshao Ramchandra Kanitkar, M A , B. Sc
- 35 J K Mehta Esqr M. A ,
- 36 Rao Sahib G N Sahasrabudhe.
- 37 C S Deole Esqr B A , Member, Servants of India  
Society
- 38 N. K Joshi Esqr , B. A

(2) *By the Bombay Native Piece Goods Merchants' Association, Bombay*

- 1 Mr Gopalji Walji Sundarji
- 2 „ Motilal Valabhji
- 3 „ Devidas Madhavji Thackersey, J P
- 4 „ Mathuradas Hanibhai

(3) *By the Indian Merchants' Chamber and Bureau, Bombay*

- 1 Mr Motilal Valabhji
- 2 Sir Vithaldas D Thackersey
- 3 Mr W T. Halai
- 4 „ G B Trivedi
- 5 „ Devidas Madhavji Thackersey.
- 6 The Honorable Mr. Chunilal V Mehta.
- 7 Mr J. K. Mehta, M. A

(4) *By the Mining and Geological Institute of India, Calcutta.*

- 1 Mr. A C Banerjee, M A
- 2 Messrs. A C Banerjee & Co., 7 Swallow Lane, Calcutta.

(5) *By the Southern India Chamber of Commerce, Madras*

- 1 Rao Sahib G Subbiah Chelty Garu
- 2 Dewan Bahadur Govindoss Chaturbhujdoss Garu.
- 3 Pandit Vidya Sagar Pandya Esqr
- 4 The Honorable Sri K R. V. Krishna Rao Bahadur B A.
- 5 B. Channayya Esqr
- 6 M R Ry C Duraiswami Aiyangar, B A

(6) *By the South Indian Association, Madras*

- 1 Rao Bahadur L. A. Govindraghava Iyer, B A, B L
- 2 Mr C P Ramaswamy Iyer, High Court Vakil
- 3 „ G Vyankataranga Rao Garu, Secretary Landholder's Association, Triplicane, Madras
- 4 „ A Rangaswami Iyer
- 5 „ L S Viraraghao Iyer, High Court Vakil, Devanpetta

(7) *By the National Fund and Industrial Association, Madras.*

- 1 Nawab Syed Mahamed Sahibkhan Bahadur, Madras
- 2 Dewan Bahadur L A Govindraghava Iyer, B A B L
- 3 Mrs Annie Besant
- 4 Mr G Gopal Menon
- 5 K S Subramania Sastriar, B A B L
- 6 C P. Ramaswamy Iyer, B A B L.
- 7 The Honorable Mr T Ranga Chariar, B A B L.
- 8 Mr T V Gopalswami Mudliar, B A B L
- 9 Mr T V Muthu Krishna Iyer, B A B L
- 10 Mr. G A Natesa Iyer, B A
- 11 „ S Satyamurti, B A. B L
- 12 „ L G Virraghava Iyer, B A. B L.
- 13 „ Vidya Sagar Pandya
- 14 „ Moulana Abdus Subban Sahib
- 15 V C Shesha Chariar, M A B L
- 16 Mr P Nagabushanum Punthulu, B A B. L.
- 17 „ A Rangaswamy Iyengar, B A B. L.
- 18 „ A C Parathasrrethy Mudliar
- 19 „ S Kasturiranga Iyengar, B A B L.
- 20 „ M K Nagaswara Row
- 21 „ Rao Bahadur C V Muniswamy Iyer
- 22 Rao Bahddur N C Rajgopal Chariar.
- 23 Dewan Bahadur C Karunakar Menon, B A
- 24 Mr T C Vaithinath Iyer
- 25 Vidyaratna Pandit D Gopal Chailu, A. V. S
- 26 K B Ramanath Iyer, M A, B L L. T
- 27 Mr P. Lakshminaram Naidu, B A
- 28 Dewan Bahadur Govinddass Chaturbhujadas Doss.
- 29 Mr N. R K Thatha Chariar, B. A B. L.
- 30 Mr, P. R. Lakshmanaram Iyer,

- 31 V Arunagiri Naidu, Esqr , B A
- 32 M<sub>1</sub> K C Desika Chariar, B A. B L
- 33 „ V V Srinivas Iyengar, B A B L
- 34 „ N Subba Row Punthulu, B A. B L
- 35 S Aravamuthu Iyengar, Esqr , B A B L
- 36 A Jagatheeswara Iyer, Esqr B A. B L
- 37 M<sub>1</sub> T S Vishvanath Iyer, B A.
- 38 S Rajagopal Chariar, Esqr , B. A
- 39 M<sub>1</sub> N S Tiruvengada Chariar, B A
- 40 „ V R Karandikar
- 41 „ M S Kamath
- 42 „ S Natesa Iyer
- 43 „ N Soundraja Iyengar
- 44 „ T S Krishnaswamy Iyer
- 45 „ V Subba Row.
- 46 „ M K. Rajagopal Chariar
- 47 „ V R Samont
- 48 „ G S Amandule
- 49 „ K Saundaranjan
- 50 „ C S Sadagopa Ramanuja Chariar.
- 51 „ T S Anantrama Iyer
- 52 „ G Vyankatranga Rao Punthulu, M A , Madras
- 53 „ M B Krishna Chettiar, Palkod.
- 54 „ Sadhu Ganapathy Punthulu, B A B L
- 55 „ M Krishna Row Ongole
- 56 „ T Ranganatham Naidu, Perambur
- 57 „ A Srinivas Row, Poddatur
- 58 „ P L Narsinham, Narsapur
- 59 „ V Suiya Rao, Madras
- 60 „ G A Vidyarama Iyer, B A , Madras
- 61 „ B Bhima Rao, Ballary
- 62 K Guruswami Rao Esqr , B A B L , Bellary
- 63 Mr M V Krishna Iyengar, B A B L , Tuticorin
- 64 „ S V Vishvanath Iyer, B A B L , Tuticorin
- 65 „ N K Ramaswamy Iyer, B A B L Tanjore
- 66 E Suryanarayana Sastri, Esqr , B A B L , Tanjore
- 67 M<sub>1</sub> N Manakshisundar Iyer
- 68 „ R Giriram, B A , Madanpalli
- 69 „ Dharamsey K Asher, Madras
- 70 „ H Anantsubaramaya Iyer, Triplicane

(8) *By the United Provinces Chamber of Commerce, Cawnpore*

- 1 The Hon'ble Mr Munshi Prag Narayan Sahib Bhargava.
- 2 Pt Lakshaman Prashad Sahib Pande, Lucknow
- 3 B Alakh Dhari Sahib, Gwalior.
- 4 K. C Bhalla, Esqr, Allahabad
- 5 Krishna Rao Mehta, Esqr, Allahabad.
- 6 The News papers limited, Allahabad
- 7 Sri Gangaji Cotton Mills Co Ltd, Allahabad
- 8 The Hon'ble B Madasudan Dayal Sahib Hapur
- 9 The Hon'ble Lala Sukhabir Singh Sahib, Muzaffarnagar.
- 10 Rao Vajjanath Das Sahib Sahpuri, Benares
- 11 The Honorable B Motichand Sahib, Benares
- 12 The Allahabad Tannery, Allahabad
- 13 Rai Bahadur Sahib Purshottam Saran Sahib, Moradabad
- 14 Rai Krishnaji Sahib Benares
- 15 The Canal Foundry Works, Roorki
- 16 L H Brothers' Sugar Factory, Pilibhit
- 17 Bank of Upper India Ltd Meerut
- 18 K N Kacker, Esqr Bareilly
- 19 Messrs Ramchandra Gureeshai Mal Cotton Mills Co Ltd
- 20 Raja Munshi Madhao Lal Sahib, C S I, Benares
- 21 Rai Bahadur Lala Bishwambar Nath Sahib, Cawnpore
- 22 Hafiz Mohamad Halim Sahib, Cawnpore
- 23 Lala Munnalal Sahib, Cawnpore
- 24 Shet Ram Gopal Sahib, Cawnpore
- 25 Lala Dina Nath Sahib, Cawnpore
- 26 B Vikramjit Singh Sahib, Cawnpore
- 27 B Nandan Prasad Sahib, Cawnpore.
- 28 Pandit Vishwanath Sahib Tholal, Cawnpore
- 29 B Dwaika Prasad Singh Sahib, Cawnpore
- 30 Mohammad Ismaili Sahib, Cawnpore
- 31 The Union Sugar Works, Cawnpore
- 32 Messrs Gulab Rai Mahadeo Paishad Sahib, Cawnpore
- 33 Messrs Bilas Rai Heidat Rai, Cawnpore
- 34 The Premier Oil Mills, Co Ltd Cawnpore
- 35 The Indian Distillery, Cawnpore
- 36 Rai Bahadur Lala Kannia Lal Sahib, Cawnpore
- 37 B Behari Lal Sahib, Cawnpore
- 38 The National Bank of India Ltd Cawnpore.



(9) *By the Desi Beopari Mandal, (Indian Chamber of Commerce), Lahore*

- 1 L Harikishen Lal, Bar-at-law, Lahore
- 2 Mallika Girdharilal, Managing Agent, P. O P, Lahore
- 3 K. C Vidyarthi, Esqr, Managar, B I O Co Ltd., Lahore
- 4 L Dhanapat Rai, Pleader, Lahore
- 5 Sheikh Umar Baksha, Pleader, Lahore
- 6 Mr Gopal Iyengar, Editor the "Tribune" Lahore
- 7 L Charanjit Lal Sethi, Lahore

(10) *By S S Halkar, Esqr M A, LL B. Vakil High Court, Rangoon*

- 1 Dr P J Mehta, M D Bar-at-law
- 2 J C Billimoria, Esqr Do.
- 3 J C Ray, " "
- 4 J. N Basu, " Advocate
- 5 C G S Pillay, " "
- 6 U. Be Thein, " Bar-at-law

(11) *By the Bengal Provincial Congress Committee, Calcutta*

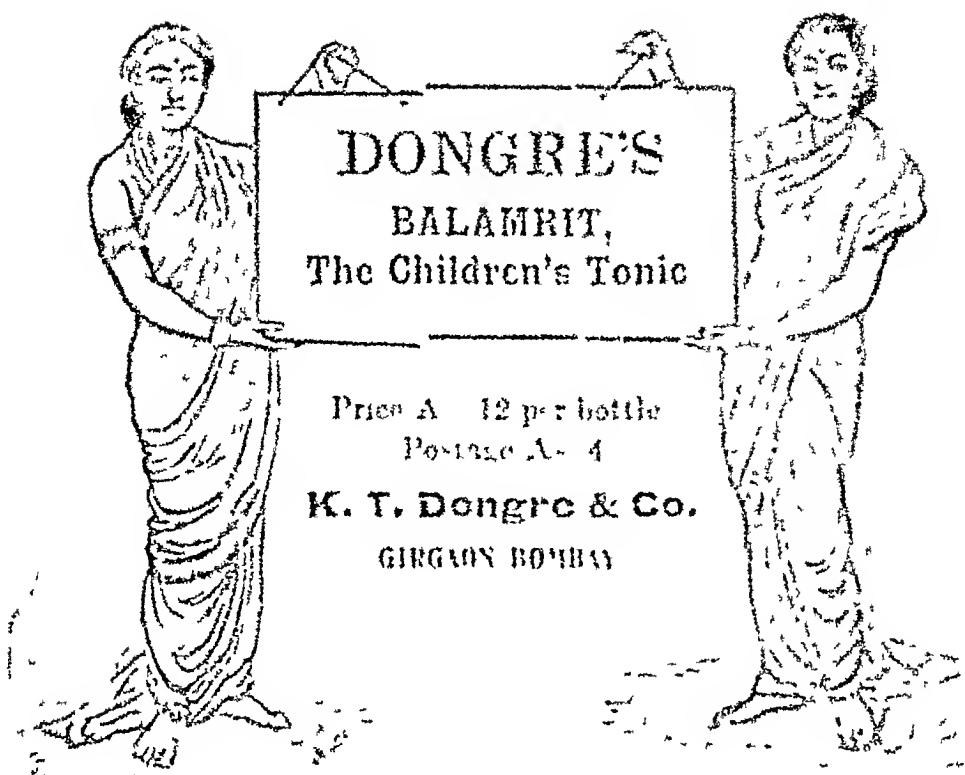
- 1 Maharaja Sir Manindra Chandra Nandi Bahadur, C I E
- 2 The Honorable Dr Nilratan Sirkar
- 3 Mr B Chakravarti
- 4 " J Chaudhari
- 5 Babu Krishna Das Roy
- 6 The Honorable Mr Prawesh Chandra Mitra
- 7 Dr. Pramathanath Banerjee
- 8 The Honorable Mr Bhupendra Nath Basu.
- 9 Babu Pruthiwish Chandra Roy
- 10 The Honorable Mr Prowas Chandra Mitra
- 11 Mr B K Laheri
- 12 Babu Satyendra Nath Bose

(12) *By the Berar Provincial Congress Committee, Amraoti*

- 1 The Honorable Rao Bahadur R. N. Mudholkar, C I E
- 2 Rao Bahadur V M Mahajani, Akola,
- 3 Rao Bahadur R G Mundle, Yeotmal.
- 4 Rao Sahib K V Brahma
- 5 Rao Sahib B R Landge, Yeotmal
- 6 Rao Sahib Ganesh Nagesh Sahasrabudhe, Ellichpur.

- 7 Mr R R Jayant
  - 8 „ M G Damale
  - 9 „ M B Sant
  - 10 „ Dinkar Madhav
  - 11 „ N B Bind, Badnera
  - 12 „ M B Paranjpe
  - 13 „ B V David, Yeotmal
  - 14 „ K V Jamkhindkar
  - 15 „ R V Mahajan, Akola
  - 16 „ L R Abhyankar, Yeotmal
  - 17 „ R A Deshpande
  - 18 „ G N Kane
-

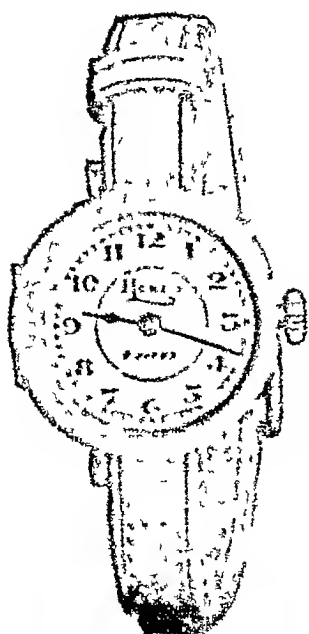




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# REPORT

## ON THE WORK OF THE OFFICE

### OF THE

# INDUSTRIAL CONFERENCE

## AND RECORD OF

*General Industrial Activity in the Country in the  
twelve months ending with November 1916.*

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### Part I.

### Industrial Conference Work.

*December 1915.*

The Annual Report submitted to the Eleventh Session of the Indian Industrial Conference held at Bombay in December 1915, covered the period of twelve months from December 1914 to November 1915. During the months of November and December 1915, the office of the General Secretary was as usual engaged in the work of organising the last Session of the Conference, in co-operation with the office-bearers of the Reception Committee formed at Bombay. The Assistant Secretary, Mr M. B. Sant proceeded to Bombay in advance nearly a fortnight before the meeting of the Conference.

The Conference itself was held on the 24th and 25th December 1915 under the Presidency of Sir Dorabji Jamsetjee Tata, Kt, of Bombay in the Pandal specially erected for the Indian National Congress. Full account of the Proceedings of the Conference including the texts of the Speeches delivered by the Chairman of the Reception Committee, Sir Dinshaw Manekjee Petit, Bart., the

Presidential address of Sir D. J. Tata, the resolutions passed at the Session together with the speeches delivered during the discussion on these resolutions and the texts of papers specially contributed by official and non-official gentlemen of position and learning possessing expert knowledge of the subjects dealt with by them, which were submitted to the Conference, will be found in the Consolidated Report of the Eleventh Session of the Conference. This Report has now been laid on the table of the Conference and a few copies have already been supplied to the Press.

*January to November 1916.*

Resolution No. 15 passed at the last Session, reappointed me as General Secretary and Mr. M. B. Sant as Assistant Secretary and authorised the General Secretary to appeal to the public for raising the sum of Rs. 8,000 for the purpose of carrying on the work of the Conference during the year 1916. In compliance with this resolution, appeals were sent to prominent Zamindars, Ministers of principal Indian states, Mill-owners, leading merchants and Industrialists and also to the well-known leaders of public opinion in different parts of the country. This year a copy of the appeal issued by the Conference was sent to nearly all important newspapers in India and many of them were good enough to publish the same in their columns. This expedient was specially tried this year for the purpose of approaching the larger circle of educated classes in the whole country, which could be approached only through the press. But owing, whether to the financial and economic depression in the whole country due to the War or to indifference, the response to this appeal was extremely poor. Nor are the promised and publicly announced subscriptions always received, though reminders after reminders are sent. I trust that those whose subscriptions remain unpaid, will kindly remit the same now at least as speedily as possible. The Reception Committee formed at Bombay contributed only Rs. 98-10-1 towards the expenses of the last Session and a greater portion of these had to be met out of the general funds. The expenses in connection with the holding of a Session of the Conference fall legitimately on the Reception Committee of the Province, where the Conference is held, but I regret to have to state that neither in Bombay nor in Madras have the Reception Committees kept this principle

in view. It is from the general funds of the Conference that many items of the expenses of the Conference Session held in these cities had to be met.

It will be seen that out of the sum of Rs. 8,000 which the last Conference authorised the General Secretary to raise, only Rs 2,599 have been realised during the year. It is a matter of regret and surprise that at a period in the history of our country, when the importance of industrial development, of technical and scientific education, research and other problems connected with the progress of India are under discussion, and the need for vigorous action is recognised and advocated by the leaders of the country, the response for funds to send qualified men to organise such actions, should have met with a feeble response.

The presence of Mr. M. B. Sant was always required at the head-quarters. The work of enquiry, of exhortation and organisation requires that at least two qualified persons should be sent to different provinces to evoke practical activity on sound lines, which is essential for the development of the country. The supply of information stands in need of proper organisation and this also is a question of funds.

The General Secretary of the Conference has long felt that the time has come, when instead of having papers, some of which are very informing and instructive—mostly placed on the table of the Conference and taken as read or of having purport of a few summarised in five or ten minutes, it would be more profitable to call for special papers on two or three of the Chief Industries and to have discussions on them. Similarly instead of a number of general and vague resolutions or repeating the same resolutions year after year, it is necessary now to take up a few resolutions suggesting specific practical action, have full and informed speeches on them and then pass in an omnibus form such of the previous resolutions as stand in need of reaffirmation. But, for these changes to be properly carried out, there should be devoted at least two days to the Session of the Conference. This means that persons feeling real interest in the Congress should religiously set aside two days for the Industrial Conference either before or after the Session of the Congress.



The complaint has been made in certain quarters that with the exception of one or two announcements of a formal nature, such as the election of the President, the date of the Conference and the election of delegates, persons taking interest in the Industrial movement get no occasion to come into contact with the Conference organisation. This is in the first place not an accurate or just statement of facts. A lot of inquiries are made, a number of letters are received and these are attempted to be dealt with according to the capacity of those entrusted with the work.

Secondly, when the Secretary or the office puts forward any scheme or suggestions and invites opinions from persons taking interest in the cause of industrialism in India, not even a fourth of those consulted or addressed give any response. I have no right to blame those who do not reply, for they may consider that their own work is of greater importance than the queries put to them. But when complaint is made about the lethargy of the Conference office, justice demands that the real state of things is placed before the country. In connection with this, I would tender my grateful acknowledgments to those gentlemen, who have ever manifested their readiness to give their advice and assistance in the way of direction as willingly and readily as by way of munificent pecuniary help.

One of the circulars issued this year, invited opinions as to the desirability of having a full and detailed discussion in the Conference to be held this year, on two or three of the following subjects :—

- (a) Sugar industry.
- (b) Paper and paper pulp manufacture
- (c) The Glass Industry
- (d) Revision of Railway rates so as to make them suit the needs of Indian commerce and Indian Manufacture.
- (e) Selection of the questions to be laid before the Indian Industrial Commission.

The second circular letter, which is reproduced in this report was issued in August and again copies of the same were sent in November requesting the Press and the gentlemen specially ad-

dressed to suggest names of prominent people likely to help to the Conference Office in

- (a) collecting information in regard to several trades and industries and supplying the same to the Conference
- (b) popularising the aims and objects of the Conference
- (c) reviving the existing Provincial Committees and forming new ones
- (d) collecting funds for Provincial and All-India work.

This circular also called for constructive suggestions in regard to new work of a more practical and useful kind, which in their opinion, the Conference office should take up in future, instead of or in addition to the work, which it is now doing.

The replies so far received to these letters are summarised below.—

- (1) Sir Dorabji J Tata, Kt, who presided over the last Session of the Conference was courteous enough to send a prompt reply. He makes specific mention of the Indian Economic Society in addition to the associations like the Indian Merchants' Chamber and Bureau and names which are generally known in the Industrial life of the Province

In regard to the future work of the Conference, Sir D J. Tata suggests the following —

- (a) A detailed survey of the existing Industrial situation.
- (b) Analysis of the causes of our industrial backwardness particularly of Swadeshi failures
- (c) Collection of evidence as to the most suitable and practical lines of progress and of materials for making representations on the subject to the Indian Industrial Commission

The Honourable Mr. C Y. Chintamani, one of our best informed and sympathetic friends could not make any detailed sug-

gestions or answer our queries owing to his indifferent health. He, however, admits that men and money are wanted to push on the work of the Industrial Conference.

Dr. Harold H Mann writes from Poona to say that he would like that the Conference should organise close, detailed, and critical inquiries in local areas into the causes of Industrial stagnation and collect facts in place of mere opinions, applying this method to industries like hand loom weaving and sugar making.

Mr. Hayavadan Rao, the Editor of the Mysore Economic Journal, Bangalore, mentions the names of one or two gentlemen, who take an active interest in industrial matters and mentions activities, given below as worthy of being taken up by the Industrial Conference —

- (1) Formation of Joint Stock Companies.
- (2) Facilities for foreign training to suitable men, both educated and commercial.
- (3) Employment Bureau for trained men.
- (4) Provision for an All-India Shop in a central locality.
- (5) Establishment of a State aided Technological College
- (6) Providing better credit facilities for people inclined to industrial work.

As regards subjects that should be taken up by this year's Session, he recommends the following. —

- (a) Organisation of Indian manufactures, trades and industries to suit post-war conditions
- (b) Study of Foreign and Indian markets.
- (c) Appointment of Indian Commercial Attaches and Assistants to Consuls.
- (d) Sending out batches of merchants to foreign countries.

Mr Vidya Sagar Pandya, Secretary to the Indian Bank, Ltd, of Madras suggests that the question regarding the settling of a permanent constitution for the Conference should be given prominence over every other during the coming Session and that a well considered scheme for the industrial development of the country should be placed before the Industrial Commission,

Mr. C. Gopal Menon in his reply gives a list of ten gentlemen who are in his opinion interested in the work of the Conference. With regard to the future work of the Conference, Mr. Menon merely remarks that the Conference should do some sort of practical work instead of making any definite statement and recommends that this question should be brought up before the Lucknow Session

Mr. A. M. Simpson of Gwalior in response to our press communique, suggests the systematic organisation of industries as in Western countries and in Japan, by getting together all the political agitators and establishing an Association for the advancement of Indian industries.

A correspondent of the "Gujrathi" who signs himself "Kadiri" suggests the working out of a feasible plan for the development of glass and sugar industries

Rao Saheb Ganesh Nagesh Sahasrabudhe of Ellichpur draws up a set of questions and suggests that the General Secretary should send a copy of these questions to about 100 prominent factory owners and manufacturers of various articles of daily use and the replies to these questions should be placed before the Conference for disposal. He has also made certain suggestions in connection with the framing of the constitution of the Conference

Mr. John Wallace, the Editor of the Indian Textile Journal, Bombay, advocates a change in the method of instruction in primary schools restricting it to such things as will be immediately useful, when the children go to work. In fact, in his opinion, industrial progress must move from workshop upwards.

The above is a summary of the replies and suggestions received by the Conference office so far. In addition to the above suggestions, the following subjects may also fall within the purview of an economic association like the Industrial Conference—

- (1) To furnish free of cost schemes, estimates and specifications for the starting of different industries.
- (2) To start some useful industries on experimental basis and after conducting them successfully to hand them over to the public bodies or private individuals.



1 The objects of the Indian Industrial Conference shall be attained —

- (1) By the holding of Annual Conference on industries and industrial progress in India
- (2) By the establishment of Standing Provincial Committees for the co-ordination of efforts directed to the promotion of Industrial progress under a Central Committee
- (3) By the publication of periodical bulletins and reports on the work done and results achieved every three months, and by such other means as may be deemed advisable

2. The standing committee of the All-India Industrial Conference shall consist of (1) the President of the Previous Conference (2) the Secretary and the Assistant Secretary, the Treasurer, if necessary, of the Conference and the Secretaries of the Provincial Committees. The duty of carrying on the work of the Conference shall vest in the said standing Committee, who shall be placed in possession of funds for the purpose in accordance with these rules.

3. The All-India and Provincial Standing Committees may recognise other organisations sympathising with the objects of the Conference on payment of an Annual fee of Rs 10, and thereupon the said institutions shall be entitled to elect Delegates to the Conferences held by the Provincial and All-India Committees. That the Provincial Standing Committees may arrange for the holding of Provincial and District Conferences and Exhibitions from time to time.

4 That half the amount of the delegation fees and a further sum to be raised by subscriptions to an amount not exceeding shall be placed at the disposal of the All-India Standing Committee for carrying on the work now being done by the Secretary on behalf of the Conference and that further amounts may be similarly raised, whenever necessary.

5. That an account of the monies received and spent by the All-India Committee shall be rendered by them at the Annual

Conference and they shall arrange for its being duly audited and published.

6 That the business of the All-India Committee may, if necessary, be transacted by correspondence and by a majority of the votes recorded in each case

7 That the work of holding the Annual Sessions of the Conference and the expenditure in connection therewith shall be performed by Reception Committees organised annually by the several Provincial Committees of the Provinces where the Conference is to assemble —

- 1 Sir R N Mukerjee (Calcutta)
- 2 J Chowdhury, Esqr ( , , )
- 3 Rai Seetanath Roy Bahadur (Calcutta)
- 4 Purshottamdas Thakurdas, Esqr, (Bombay)
- 5 Hon'ble Sir Fazulbhoy Currimbhoy, (Bombay)
- 6 The Hon'ble Mr Manmohandas Ramji, ( , , )
7. The Hon'ble Mr Lalubhai Samaldas ( , , )
- 8 Rao Bahadur P Theagaroya Chetty, (Madras)
9. Yakub Hussan, Sait, Esquire (Madras)
10. O Gopal Menon, Esquire ( , , )
11. Vidya Sagar Pandya, Esquire ( , , )
12. O. Y Chintamani, Esquire, (Allahabad)
13. Dr. Satish Chandra Banerjee ( , , ).
14. Mr Muzharul Haque, Esquire (Behar)
15. Rao Bahadur Hiranand Khemsing (Sind)
- 16 Lala Mulkharaj Bhalla, Esquire, (Punjab)
17. Hon'ble Rai Purnendu Narayan Singh Bahadur (Behar)
18. The Hon'ble Mr M B. Dadabhoy (C. P)
19. The Hon'ble Rao Bahadur R. N Mudholkar (*Ex-Officio*)

Some time after the Session, letters were sent to the members of the Sub-Committee whose replies are summarised in my Note of December 1915 reproduced below. The attention of the members of the Sub-Committee was invited to the draft prepared in the Conference Office in 1906, the proposals in which draft were then deemed as too far in advance by such authorities as the late Mr Romesh Chandra Dutt, and Mr Wacha, the only two gentlemen of those invited to give opinion, who went minutely into the matter. As no detailed or practical suggestions were received, I drew up and circulated the following Note.

## NOTE

### On the proposed constitution for the Indian Industrial Conference.

The Tenth Resolution of the last Conference suggesting for consideration a constitution laid before it and instructing the Committee appointed therein to scrutinise the same and place it for adoption before the next Conference was, circulated to the members of the Committee. Replies were received from ten members. Most of these expressed their approval of the proposed constitution. Verbal alterations and a few additions and changes not affecting the basic principles were suggested by one gentleman. One pointed out an omission and another some defects. Both these were past Presidents. One member with very great experience of Conference work frankly avowed his disbelief in the necessity for a constitution. Seven members gave no replies at all, and these included public men of high repute and great knowledge of industrial, commercial and financial matters. The Executive Committee of the Bombay Reception Committee has in the draft Resolutions which were circulated, suggested a few changes. They are (1) the deletion of the words "if any" before "treasurer" (2) the omission of the Assistant Secretary from the proposed Council (3) substitution of Secretaries of Provincial Committees for the two representatives suggested by the Resolution and (4) what is more radical, the introduction of a provision laying down that the office of the Conference shall be located at one of the Presidency Towns. As the term Presidency Towns applies only to Calcutta, Madras and Bombay, this suggestion means that the office should be located at one of these three places only.

To me personally, it appears that while the recommendations made in the Resolution passed at Madras last year are desirable so far as they go, some most important matters of a vital character are absent therefrom, and it will not be possible to have a Constitution properly so called, or even a workable Constitution, should any differences or difficulties arise, without them. I would have put these on paper and drawn up a detailed scheme for a Constitution according to my lights, had I not felt that the scope of the Committee was restricted by the terms of the Resolution.



which empowered the Committee only "to scrutinise the same" (i.e., the Constitution suggested) and place it for adoption before the next Conference." I further feel that such an important thing as the preparation of a Constitution can be satisfactorily done only by a Committee, the members of which meet and discuss the main articles of the Constitution, the bye-laws and the rules and then settle them. Discussion amongst members, who meet together and deliberate over all the *pros* and *cons*, can alone secure a well thought out and properly worded complete scheme. Circulation of a draft scheme with various suggestions thereon and correspondence on them, is not in my opinion a satisfactory substitute. I have mentioned above that important matters of a vital character are absent from the recommendations made in last year's Resolution. These are:—

I. The determination of what is the Industrial Conference, who are to constitute its main body? On what basis are the members of that main body to be selected, elected or enrolled? Who are to select, elect or appoint members to the main body?

II Is it not necessary to secure a legal corporate existence and perpetual succession for the Conference organisation without reference to the individuals composing it? If so, how is that object to be attained?

III What should be the qualifications of the members selected, elected or appointed and what are to be their powers?

IV Since the Conference is and ought to be kept up as a national institution, how are the claims of the different provinces to be adjusted (a very difficult and thorny question)?

V Should there be a distinction between this main body of the Conference and the delegates who are deputed to take part in the deliberations at any particular Session of the Conference?

VI Who are to elect delegates and what are to be the qualifications of delegates?

VII The clear specification of the aims, objects and function of the Conference. The Resolution speaks of the objects of the Conference, but these ought to be specified when a Constitution is drawn up.

All these matters, which are matters of principle, should, I am firmly of opinion, be determined and placed on a clear basis now that the drawing up of a Constitution is taken in hand. The present nebulous state of things ought not to be allowed to continue

I. The Indian Industrial Conference should have a legal form and its aims, objects and functions should be defined. It should be a Society or Association whose corporate character ought to be secured in the manner laid down by law. It must be either a Society registered under the Act XXI of 1860, or an Association registered in accordance with section 26 of the Indian Companies Act of 1913 under a license from a Local Government. It will be only then that it will be a legal body corporate.

II To secure this, it is necessary to determine (a) who are to associate themselves in seeking registration and (b) on what conditions and how are new members to be admitted.

This means the framing of Statutes and Bye-laws and (to be safe) of provisional subsidiary rules also. We might, like the proposed Associated Indian Chamber of Commerce, have a Memorandum and Articles of Association and get ourselves registered under section 26 of Act VII of 1913 after obtaining a license. Or as in the case of the Berar Victoria Technical and Industrial Society, which has been established and is maintaining the Berar Victoria Memorial Technical Institute, get ourselves registered under Act XXI of 1860 after framing the main laws and bye-laws. In either case, a comprehensive and complete scheme has to be drawn up. But before it can be drawn, the principles have to be settled and agreed to, and in the absence of that, it is not possible for any member of the Committee appointed last year to put forward any draft scheme.

The only satisfactory course in my opinion is that a small Committee of not less than seven nor more than eleven should be appointed by the Conference, immediately after the delivery of the Presidential Address, to draft the main principles on which the Conference organisation is to be based, and this Committee should set to work from that, or the following day, and hold its sittings every day and finish its work by the 29th instant. There should be a meeting of the Conference on the 30th, before which the report

of this Committee should be placed, and after the approval by the Conference of the lines recommended, with or without modifications, the Committee and the General Secretary should be empowered to get the same embodied in a proper legal form by a qualified lawyer before the end of 1916. When the drafts are received from the lawyer, they should be forthwith printed and published and copies specially sent to the members of the Standing Committee and such other persons as may be determined upon. Any person, who has amendments to propose should send them to the Secretary before the 31st of July 1916, the Secretary should get printed all these suggestions and send them to the members of the Committee appointed to frame the Constitution. This body should meet to consider these amendments one day previous to the meeting of the Conference of 1917, and submit its final report and proposals to the Conference on the first day of the Session.

*Amraoti,*  
*14th December 1915.* }

R. N. MUDHOLKAR,  
*General Secretary,*  
*Indian Industrial Conference.*

The Note shows the important matters of principle, on which authoritative directions were needed to be given to the person or persons, to whom the work of drafting had to be assigned. It was very pointedly brought to the notice of the Conference, that these principles cannot be settled and directions given except by discussion in a meeting or meetings. The Note was placed first before the Standing Committee and then before the Subjects Committee, both of which bodies agreed with the view advanced therein. The matter was brought before the Conference, when the President Sir Dorab Tata in placing Resolution No 14 said as follows.—

“Brother-Delegates, this is a formal proposition. I understand that last year at Madras, there was some discussion as to the constitution of the Conference, and a Committee was formed to draw up a constitution to be adopted at this Conference, but owing to the unfortunate geographical difficulties, our delegate-members from the far North could not meet those in the Southern Presidency and so a meeting of that Committee could not be held, nor was it possible for these gentlemen, some of whom are pleaders or members of other avocations, to devote much time to this subject. So the result is that the constitution, which was to have been drawn up,

could only be got ready just in time for this Conference. It was presented to the Subjects Committee for approval, only the day before this Conference was held. Time was too short for the discussion and adoption of the constitution, and therefore, it was resolved that a further attempt be made to revise the constitution and to put it in a better form; consequently, it is now my duty to propose to you that a Committee consisting of the following ten gentlemen be appointed to carefully consider this proposition. It has been suggested that they should take advantage of their presence here to discuss the thing in Committee before the end of this year. I hope the question will be gone into this year, because I am afraid, that if this opportunity is again allowed to lapse, we shall have to wait for another year. I hope the delegates present here will not have again to wait for a year, before the constitution is presented to them. In this connection, I would say that during the eleven years of its existence, this Conference may appear to its detractors to have achieved nothing more practical than talking. Therefore, I hope that you will all join me in helping to carry out this suggestion."

The Resolution passed runs thus —

"That in regard to the constitution proposed at Madras, it is resolved that the following Committee should be appointed to draft the Constitution of the Indian Industrial Conference and report not later than the 31st March 1916:—

1. The Hon'ble Mr. Lalubhai Samaldas, Bombay
2. Sir Vithaldas D Thackersey, Kt, Bombay
3. The Hon'ble Pandit Madan Mohan Malaviya, Allahabad
4. Mr. C Y Chintamani, Allahabad.
5. Hon'ble Rao Bahadur R N Mudholkar, *Ex-Officio*,  
Amraoti
6. Mr Vidya Sagar Pandya, Madras
7. Mr. J. K Mehta, Bombay
8. Mr J. Chowdhary, Bar-at-law, Calcutta.
9. Dewan Bahadur L. A Govindaraghava Iyer, Madras
10. Mr C P. Ramaswami Iyer, Madras.

In compliance with this resolution, the General Secretary immediately issued a circular convening a meeting of the Sub-Committee on the morning of the 28th December. Five out of

the ten members attended. The representatives from Bengal and United Provinces were unable to attend and Northern India was thus entirely unrepresented. The General Secretary had sketched out a scheme in regard to what appeared to him the first things to be determined. After more than two hours' discussion, only one thing was definitely agreed to by the members present and that was the necessity of registration. In regard to four other points, there was discussion but no definite decision. As the Congress was to meet at 12 noon, the members dispersed, with the clear understanding that the Sub-Committee should meet again on the 30th in Congress grounds. On the 30th, no one except the General Secretary attended. Two out of the five members who had attended on the 28th had left Bombay and the others could not attend. On inquiry made the same day in the evening, the Secretary was informed that it would not be feasible to have a meeting on the 31st either.

As the personal discussion, which was unanimously felt to be absolutely necessary has not taken place and the very thing which had to be determined and settled first, viz, the settlement of principles and lines is still wanting, I feel myself at a loss to proceed. Blame has been thrown upon me, but that I regard as in the day's work.

I propose to try my best to have two meetings of the Sub-Committee at Lucknow before the Conference meets, and every effort will be put forth, so far as I am concerned

The appointment of the Indian Industrial Commission has raised general hopes in the country that the Government in India and in England have come to recognise that in the interest of the Empire as much as in the interest of India and the people of India, it is necessary to adopt a far more sympathetic, thorough and actively helpful policy for the development and encouragement of industries in India than was permitted to be adopted, or even contemplated by the English orthodox school of economists and politicians. The War has been a great solvent not only in military and political matters but in economic and financial matters as well; and time honoured shibboleths, prejudices and beliefs are being dissipated. The sheer necessity of even partially replacing and repairing the colossal destruction of wealth which has been going on for the last two years and five months and the end of which is not yet in view,

makes it one of the most important of the duties of a Government to work in every way, to put forth continuously its best energy, to utilise all the forces in the country it can, to develop the resources of its territories and to multiply several fold its output of useful products

The composition of the commission is such as to justify the high hopes entertained in well informed quarters. The President, Sir Thomas Holland, is a well-known and tried friend of Indian industrial development. Mr. Low's work as Director of Agriculture and Industries in the Central Provinces and Berar and the important part taken by him since the appointment of the Commission, and Mr. Chatterton's solid work in Madras and Mysore are ample guarantees of the genuine sympathy of these members. As regards the Indian members, the Conference has every cause to feel satisfaction and to congratulate itself. Sir Dorab Tata and Sir R. N. Mukerji are both past Presidents and the other two are among those whose names have been put forward for Presidentship of the Industrial Conference and who were actually sounded this year.

In the preliminary note issued by the Commission, it is pointed out that it will be the business of the Commission after establishing by a critical analysis of facts the fundamental proposition that there are room and opportunity for a very substantial development of manufacturing and other industries, to suggest the most profitable lines of action with the object.—

- (a) Of drawing out capital now lying idle,
- (b) Of building up an artizan population,
- (c) Of carrying on the scientific and technical researches required to test the known raw materials and to design and improve processes of manufacture;
- (d) Of distributing the information obtained from researches and from the results of experience in other countries; and
- (e) of developing machinery for
  - (1) financing industrial undertakings, and
  - (2) marketing products.

The questions suggested for answer are as many as 113, and fall under the following main heads and important sub-heads:—

## I.—Financial aid to industrial enterprises.

- (1) Whether any difficulties have been experienced in raising capital for industrial enterprises, if so what, and how they should be removed
- (2) Should Government give financial aid to existing or new industries by
  - (a) Money grants-in-aid
  - (b) Bounties and subsidies
  - (c) Guaranteed dividends for a limited period.
  - (d) Loans
  - (e) Supply of machinery and plant on hire purchase system.
  - (f) Provision of portion of share capital
  - (g) Guaranteed Government purchase of products for limited periods.
- (3) How far should Pioneer factories be started?
- (4) The defects in the existing Financing Agencies and how to remove them.
- (5) Co-operative Societies for developing industries
- (6) Whether Government aid should be withheld from an industrial enterprise, because it would compete with an established external trade

## II —Technical aid to industries

- (1) By the loan of Government experts.
- (2) Demonstration factories
- (3) Research abroad.
- (4) Surveys for industrial purposes

## III.—Assistance in the marketing of products.

- (1) Commercial museums.
- (2) Sales agencies.
- (3) Exhibitions.
- (4) Trade representatives.
- (5) Government patronage. How have the present rules relating to the purchases of stores by Government Departments worked?
- (6) Banking facilities.

#### IV.—Other forms of Government and to industries

- (1) Raw materials.
- (2) Land policy.

- V.—
- (1) Training of labour and supervision to improve the labourer's efficiency and skill by apprenticeship system
  - (2) And industrial and other Schools for Training of supervising and technical staff
  - (3) The mechanical engineers' rules.

#### VI.—What should be the general official administration and organisation.

- VII.—(1) Organisation of technical and scientific departments of Government, Imperial and Provincial Departments (2) Technological institutions (3) Co-ordination of reserach (4) Study of foreign methods (5) Reference libraries (6) Colleges of commerce.

#### VIII.—Government organisation for the collection and distribution of commercial intelligence.

- IX.—Other forms of Government action and organisation, under which section are included the questions about the lack of transport facilities, by Rail, Road or water, and shipping freights, patent laws, hydro-electric power surveys, mining and prospecting rules, Forest Department, Jail competition, &c

Witnesses from more than half the Provinces have been examined and I among them. In addition to my written statement and my long examination, I have been asked to put in a note about the scope of this Conference and the work it has done. It deserves the consideration of the Conference, whether a committee should not be appointed to draw up an exhaustive note dealing with all the questions and to lay it before the Commission

The resolutions passed at the 11th Session of the Conference were in conformity with the annual practice submitted to the Government of India, the provincial Governments and Administrations and also to the Darbars of the principal Indian States for their information and necessary action,



Several queries on important matters were received this year also from merchants and other private individuals and the Conference office tried to furnish the information asked for therein from the sources within its reach.

During the year under review, the Imperial and Provincial Governments, the Rulers of Indian States, as well as proprietors of principal periodicals supplied their literature free of charge I beg, therefore, to repeat my grateful acknowledgments to the Government and the people for their appreciation of the work of the Conference office by the free supply of their valuable literature and also by the purchase of books compiled in the office of the Conference

The lists of Indian Patentees and of New Companies registered during the year, are as usual appended to this Report as annexures

A duly audited Summary of Accounts showing the Receipts and Disbursements of the Conference office is also hereto appended. Our sincere thanks are due to Messrs S. B Bilimoria and Co, the well-known firm of Auditors at Bombay for auditing the last years' accounts of the Conference free of charge This year's accounts have been audited by Messrs Khare and Co, Certificated Accountants of Bombay, to whom also our acknowledgments are due.

R N MUDHOLKAR,  
General Secretary,  
Indian Industrial Conference.

AMRAOTI  
20th December 1916

}

## APPENDIX C.

No. of 1916.

## THE INDIAN INDUSTRIAL CONFERENCE.

OFFICE OF THE GENERAL SECRETARY.

FROM

The Hon'ble Rao Bahadur R. N. Mudholkar C., I. E.

*General Secretary.*

TO

THE EDITOR,

MEMBER OF THE STANDING COMMITTEE,

DEAR SIR,

In your capacity as the Editor of a well-known paper enjoying a wide circulation, A member of the this year's Standing Committee of the Conference, I consider you to be in a position to name a few prominent persons at the capital town and in mofussil places in your province, who take an active interest in the Industrial well-being of the country and will help our organization in—

- (a) Collecting information in regard to several trades and industries and supplying the same to my office from time to time.
- (b) Popularising the aims and objects of the Industrial Conference and to do other work of a propagandist nature.
- (c) Reviving the existing Provincial Committees of the Conference, which are in a languishing condition for want of enthusiastic workers and forming new ones, where none are in existence,

- (d) Various other ways, & c. in collecting funds to defray the expenses of the Conference work both at the central office and at Provincial and District centres.

Please send a list of such gentlemen.

2 In the opinion of several gentlemen the time has arrived, when the Conference office should take to some other activities of a more practical and useful kind instead of merely compiling literature on economical questions and doing other work of an educational nature Have you got any constructive suggestions to make in this matter ?

3. What subjects should, in your opinion, be taken up by this year's Session of the Conference which is to meet at Lucknow in the Congress week ?

A very early reply is requested.

Yours faithfully,

R. N. MUDHOLKAR,

*General Secretary*



*Summary of Receipts and Disbursements of  
December 1915 to*

RECEIPTS.	AMOUNT		
	Rs	A	P
Balance as per last printed accounts . . . . .	7,122	11	10
From sale proceeds of Conference publications including Rs 300 received from Reception Committee, Tenth Conference, Madras .. .. .	2,747	0	9
Funds received from the Reception Committee of the Eleventh Industrial Conference, Bombay . . . . .	98	10	1
Received for advertisement in the Report of the Eleventh Industrial Conference .. .. .	6	0	0
Miscellaneous Receipts ... .. .	5	0	0
Interest on deposits ... .. .	326	0	6
Donations ( <i>Vide</i> Appendix I ) . . . . .	2,599	0	0
<b>TOTAL ...</b>	<b>12,904</b>	<b>7</b>	<b>2</b>

We have examined the above extract with the Cash Account and Vouchers and found the same to be correct ( *Vide* our report )

KHARE & Co ,

AMRAOTI }  
Dated the 19th, December 1916. }

ASSOCIATED ACCOUNTANTS.  
( London. )

*the Office of the Indian Industrial Conference from  
November 1916.*

DISBURSEMENTS						AMOUNT.		
						Rs	A	P.
Pay of office establishment	...	..	...	..	..	1,625	8	0
Charges in connection with printing of Conference Publications..	..	..	..	..	...	2,499	14	1
Travelling and other expenses of the office staff	.			..		384	1	9
Printing charges ( miscellaneous office forms, book binding, etc )	..	...	.	...	...	169	1	0
Postage	.	..	..	...	...	312	11	6
Telegrams	..	.	.	...	...	36	1	0
Stationery	...	.	...	...	...	201	6	3
Commission on cheques cashed	...	...	...	...		4	4	0
Books and Periodicals	.			..		114	11	9
Railway freight on consignments of Conference Books, etc	..					100	11	0
Purchase and repairs to furniture	.			.		8	8	0
Lighting charges	.			.		6	13	9
Typewriter repairs and other supplies						36	3	0
Miscellaneous expenses .	...					35	12	0
Total						5,535	11	1
Balance in hand.						7,368	12	1
TOTAL						12,904	7	2

R. N. MUDHOLKAR.

General Secretary,

*Indian Industrial Conference.*



## APPENDIX I.

*Donations received during the year 1916.*

			Rs. A. P
1	Sir Dorabji J Tata, <i>Kt</i> , Bombay . . .		500 0 0
2	Sir Ratanji J Tata, <i>Kt.</i> , Bombay ...		500 0 0
3	Sir R N Mukerjee, K C I E, Calcutta . . .		200 0 0
4	Mrs Annie Besant, Madras ...		100 0 0
5	C P Ramaswami Iyer, Esq., Madras ...		100 0 0
6	His Highness Maharaja Lokendra Govind Singh, K C I E, of Datia, through Dewan Bahadur T Chajju Ram, C I E, Dewan of Datia State . . .		100 0 0
7	Rao Bahadur Sardar M. V Kibe, Indore		100 0 0
8	Dr Harold H Mann, Poona,,		100 0 0
9	The Hon'ble Mr Lalubhai Samaldas, Bombay		100 0 0
10	Meherban Shrimant Appasahib Patwardhan, Chief of Sangali		75 0 0
11	Shet Khemji Assur Veerjee, Bombay		75 0 0
12	Hon'ble Dewan Bahadur, L A Govind Raghava Iyer, Madras (for 1915)		50 0 0
13	Sir Prabhashankar D Pattani, Bombay		50 0 0
14	Ghulamali G Chagla, Esq , Karachi		50 0 0
15	The Hon'ble Mr. M B Dadabhoy, Nagpur		50 0 0
16	Hon'ble Sir Sivaswamy Iyer, Madras		50 0 0
17	Hon'ble Mr G K. Parekh, Bombay . . .		50 0 0
18	Rao Bahadur Hiranand Khemsing, Hyderabad ...		50 0 0
19	Gulabchand Deochand Javeri, Esq , Bombay .		25 0 0
20	Sir Bezonjee Dadabhoy, <i>Kt</i> , Nagpur		25 0 0
21	Hon'ble Mr T V Sheshagiri Iyer, Madras		25 0 0
22	Shet Shankarlal G Banker, Bombay ..		25 0 0
23	Rao Bahadur Khaserao B Jadhao, Baroda (for 1915)		20 0 0
24	H J Bhaba, Esq , Bombay		20 0 0
25	N Subba Rao Pantulu, Esqr , Rajahmundry ...		20 0 0
26	G A. Natesan, Esq , Madras . . .		15 0 0
27	Hon'ble Mr D E Wacha, Bombay		15 0 0
28	Messrs Nagarshet and Sons, Bombay		15 0 0
29	K N Aiyar Iyer, Esq , Madras .		15 0 0
30	Hon'ble Mr R P Karandikar, Satara ..		10 0 0
31	Hon'ble Mr Sridhar Balkrishna Upasani, Dhulia		10 0 0
32	Govindlal S Motilal, Esq , Bombay .		10 0 0



33	C. Gopal Menon, Esq , Madras				10	0	0
34	Hon'ble Ms. B S Kamat, Poona	...			10	0	0
35	D L. Dewal Raju, Esq , Coconada	.			5	0	0
36	N Pattabhiram Rao, Esq , Madras				5	0	0
37	Subramani, Esq., Madras		...		5	0	0
38	Rao Sahib R V Mahajan, Akola				5	0	0
39	K M. Javeri, Esq , Bombay ..	...	..	..	5	0	0
40	T Siwasambhan, Esq , Madras		..	...	2	0	0
41	S Samanna, Esq., Bellary ...	..	..	..	2	0	0
					<hr/>		
Total					...	2,599	0 0

**KHARE & Co.,**  
Associated Accountants,  
( London )

Government permanent unrestricted certificated auditors

*Amraoti, Dated 19th December 1916.*

No 27/N.

**THE GENERAL SECRETARY,**

**THE INDUSTRIAL CONFERENCE,**

*Amraoti.*

SIR,

As desired by you, we have examined the cash-book from 1st December 1915 to 30th November 1916 kept by Mr Sant with the receipt and payment vouchers and have found them in order

We have to suggest that a ledger should be introduced wherein all the Accounts relating to receipts and disbursements should be opened, and we have further to suggest that monthly statements should be prepared at the end of every month and should be copied in the cash-book

As suggested by Mr S B Bihmoria, we have noted that Rs. 5,000 have been deposited with Berar Oil Works in addition to Rs 1,000 deposited from 31st July 1912, making a total deposit of Rs. 6,000.

The Assistant Secretary, Mr. Sant, had in his hand postal stamps to the extent of Rs 35-7-9 at the beginning of the year, while on the 30th November 1916 he had stamps worth Rs 5-2-0.

The amount of Rs 17-11-2 represents interest received from the Bombay Bank, while Rs 233-5-4 are received from the Berar Oil Works as interest on Rs 5,000 referred to in para 3 at 6% from 21st February 1916 to 30th November 1916 and Rs 75 are received on Rs. 1,000 for 15 months at 6%, while last year the interest was calculated at 9%

The balance in hand as on 30th November 1916 would be as under:—

	Rs	A	P
Cash deposited with Berar Oil Works Co, Ltd.,			
with interest thereon ..	6,308	5	4
Cash with General Secretary	750	4	4
Cash with Bombay Bank	214	4	6
Cash with Bombay Banking Co (in liquidation)	17	14	2
Cash with Mr Sant.. .. .	77	15	9
	<hr/>		
Total ..	7,368	12	1
	<hr/>		

With regard to cash in the Bombay Banking Company, it appears that no claim was made and hence nothing is received in the shape of refund, even though the liquidator has paid six annas in the rupee

The following is the statement of receipts and disbursements for the period ending 30th November 1916 —

*Statement of Receipts and Payments from 1st December 1915 to  
30th November 1916.*

	Rs	a	p		Rs	a	p
Cash balance in hand	7,122	11	10	Establishment	1,625	8	0
Sale of books ..	2,747	0	9	Printing charges	2,499	14	1
Advertisement	6	0	0	Travelling expenses	384	1	9
Miscellaneous	5	0	0	Printing charges	169	1	0
Sundries	98	10	1	Postage	312	11	6
Interest—				Telegrams	36	1	0
Rs 17-11-2				Stationery	201	6	3
„ 233-5-4				Commission	4	4	0
„ 75-0-0				Books and periodicals	114	11	9
	326	0	6	Railway freight	100	11	0
Donations	2,599	0	0	Repairs to furniture	8	8	0
				Lighting	6	13	9
				Typewriting	36	3	0
				Miscellaneous	35	12	0
				Balance in hand	7,368	12	1
Total	12,904	7	2	Total	12,904	7	2

We have examined the above extract with the cash account and vouchers and found the same to be correct.

AMRAOTI

Dated 19th December 1916.

KHARE & CO.,

Honorary Auditors.



# BEST BECAUSE MADE SO



GIVE A TRIAL

TO

THE

WORLD

FAMOUS

## **KAMINIA OIL.** (REGD.)

The best advertised, The most patronised,  
The best criticized, The most eulogized,

IT IS COMPOSED OF:—

*Excellent vegetable medicaments delightful to use. For beautifying and increasing the growth of hair, to prevent its falling off, to restore its natural colour and to produce Cooling sensation to the head it is unequalled. Besides possesses most sweet and delicate fragrance.*

For superiority Gold medal is awarded in Mysore exhibition and a Certificate of merits in Allahabad exhibition.

**SEE IT. USE IT. BUY IT. ENJOY IT.**

Price per bottle Re 1-0-0, 3 bottles Rs. 2-10-0

Postage and V. P Charges extra

May be had of all respectable Merchants & Chemists or from

**THE ANGLO-INDIAN DRUG & CHEMICAL CO.,**  
155, MARKET BOMBAY.

## READ THE FOLLOWING OPINIONS.

**The Indian Patriot, Madras,** writes —The Kamini Oil has grown to be a household word, every man and woman not only has heard of it but also knows its smell and where to get it. It has been so popular because the chief feature of the oil is its merits, its fragrance, and the several qualities claimed for it. The results gained by its use are charming and attractive.

**The Indu Prakash Daily Paper, Bombay,** writes —Our readers are well familiar with Kamini Oil through the advertising columns of our paper and many are of opinion that purer and safer and more delightful hair Oil or hair douch than Kamini Oil is hard to find. In these days of spurious and adulteration one cannot too strongly insist upon the necessity of great care in the choice of even such a common luxury as hair Oil; and to those of our readers who are tired of other hair Oils, or who have any care for their hair we very strongly recommend trying a bottle at the first opportunity.

**The Madras Standard,** writes.—We have had the occasion to test the merits of this Oil from some original bottles which the Company submitted for inspection and we have no hesitation in truthfully reporting the fact that we have found the Oil to be distinctly superior to the many cheap and worthless preparations that are now flooding the markets besides being composed of the most harmless ingredients and having a deliciously charming fragrance of its own.

**Mr. S. Panlose of Muvāthpuzha,** writes —I used Kamini Oil with great delight and found sufficient cause to be thankful for its marvellous effect. The Oil is extremely cooling and an "EXPERT DOCTOR" to drive away violent headache. Please send per V. P. P. one bottle of Kamini Oil at an early date.

**C. U. R. Carvello Sub-Assst. Surgeon Perim Islanda** recommends.—No doubt, I found Kamini Oil good and satisfactory especially in dandruff and scalp, a good and speedy recovery. So I advised many of my patients who use it now. Please supply by V. P. 6 bottles of Kamini Oil and oblige.

**Dr. R. Narasingha Iyengar, 6-63, Sullivan Street, Coimbatore,** writes —I am glad to certify that Kamini Oil is one of the best Hair Oils in the world. Two years back a female of my house suffered badly from itches on her head and at the end a great portion of her hair fell off. She used Kamini Oil for some time and the hair grew with vigour again. Its fragrance is really pleasant and its medical properties beneficial. So I request you to send me 3 bottles of Kamini Oil.

 MARVELLOUS NEW REMEDY.

# ODMAN'S CYPRESS SALVE

(Regd.)

A new and remarkable cure for all sorts of pains and aches for rheumatism, sciatica, gout, lumbago, inflammatory joints and kindred ailments.

Rub it well into the place where the pain or inflammation is, and you will be surprised to see how speedily you get well.



"Cypress Salve" is splendid for Headache, bringing absolute relief at the first application and as it cures headaches so does it cure Neuralgia.

For many years this marvellous remedy has relieved and cured the most difficult cases. It succeeds where others fail. Try it to-day, now, while it is fresh in your mind.

Price: Re. 1 per pot, V. P. P. Annas Four extra.

---

## DIL BAHAR HAIR OIL and GULSHAN HAIR OIL.

(REGISTERED)

Different people have different tastes for perfumes and so we have manufactured "Dil Bahar Hair Oil" and "Gulshan Hair Oil" on the same basis as "Kaminiã Oil", having different, but mild and sweet fragrance.

Price, Re. 1-0-0 Per Bot. 3 Bots. Rs. 2-10-0, V. P. P. Charges Extra.



# The Great American Remedy

PROF. JAMES'

## ELECTRO-TONIC PEARLS

For  
**WEAK & PALE PEOPLE.**

**POSITIVELY  
CURE**



all Nervous Diseases, Sleeplessness, Spermatorrhœa, Failing Memory, etc., and restore Brain Fag, Incapacity for study or business, General Debility; Premature Decay, Exhausted Vitality, the result of overwork and dissipation

Constitute sustaining and life-giving elements of special value to Professional and Literary men, Clergymen, Tutors, Students, Lawyers, Clerks, Athletes, Businessmen, and all

engaged in mental occupations.

In Neurasthenia and the Impotence of old age, the effects of these Pearls are especially marked

They cure all abnormal discharges, build up the delicate tissues, and restore to manhood broken-down fagged-out or weary constitutions.



# TESTIMONIALS

**M. K. Chaudhry, Shirēstedār, Criminal Court, Residency Indore,** writes :—Will you kindly send to my address per V P P. 3 bottles Prof. James' Electro-Tonic Pearls as early as possible. The one which I received before appears to have done some good to me.

**G. Subba Shastri, Students Home Maharaja's College, Mysore :—**I am glad to inform you that your pills are a boon to health. Please send me a bottle of (Prof James' Electro-Tonic Pearls) the same containing 40 pills at your earliest convenience.

**S. Raghavier, Sub-Assistant, Surgeon, Cuddalore .—**Prof James' Electro-Tonic Pearls had a wonderful effect on two of my patients. You will be good enough to send me by V. P. P. unregistered parcel 3 bottles of 40 pills each of the above at your earliest convenience.

**Manashe Elijah Engineer, Amarappa Palli, The New Gin & Press Co., Yadagiri :—**I am glad to inform that I have used your Prof. James' Electro-Tonic Pearls, which you sent me 3 bottles, and they gave me satisfaction within few days only. So kindly send me another 6 bottles of 40 pills by V. P. post and oblige.

**D. A. Row, Native Doctor, Shivaganga (Bangalore Dist.) :—**I am very glad to say emphatically that your pills are showing better and better results as the days are passing and having a magical effect are the best of all tonics of the world. Please send me a bottle of your "Electro-Tonic Pills."

**S. V. Vaidya, Asstt. Station Master, Darekasa, (Dt. Bhandara) :—**I had asked you for one bottle before, which is exhausted now and I found much benefit from it as regards to stomach complaints, indigestion, constipation, &c. So please send me two bottles more each containing 40 pills by V. P. P.

**K. M. Paul, C/o Agent, Burn & Co., Ltd. Berhampore, (Dt. Ganjam) :—**In last April I got 3 bottles of Electro-Tonic Pearls through Dr. B. F. Powell of this place, which I found very excellent ones. Again please send me 3 bottles of the same per V P P at an early date.

**Dr. Muhammad Rafiq, Kabirwala (Multan) :—**A few days ago I asked you to send 2 phials of Electro-Tonic Pearls to a patient of mine. The patient has received the pearls and he is deriving much good from their use. He says that he found the pearls far more beneficial for the nervous debility than the previous medicines he used for its treatment.

# ***Soft Beautiful Skin.***



## ***Kaminia*** **COLD CREAM**

is a balmy, dainty, and the most beneficial skin application. We recommend it as the one ideal preparation for improving and preserving the health and beauty of the skin, it has a captivating fragrant odour, and put up in decorative China Pots.

Price annas twelve per pot.

Postage and packing charges extra.

## ***Latest Novelty*** **"Kaminia" Brand.** **OTTO JASMINE**

Finest perfume of various kind of Jasmine flowers.

1 Dram bottle in a fancy nickle case ...	Rs. 1-0-0
½ oz. bottle ... ..	Rs. 3-0-0

## **OTTO GULSHAN.**

(REGISTERED)

Marvellous New Perfume. Delicate and lasting.

1 Dram bottle in a fancy wooden case...	Rs. 0-12-0
½ oz. bottle ... ..	Rs. 2-0-0

V. P. Charges extra.

THE KING OF PERFUMES

# Otto-Dilbahar

(Reg.)

Fragrant, Dainty and lasting, yet never over powering  
but a subtle suggestion of Eastern Luxury and splendour.



Contains no Spirit or alcohol but it is an essence of  
a thousand flowers.

Try Otto Dil Bahar and realize yourself the  
daintiness of this lasting perfume.

Price per Small	Bottle ...	..	Rs. 0 8 0
" " Medium	" .	..	Rs. 0 12 0
" " Large	" (1/2 Ounce)	..	Rs 2 0 0

Perfumed Card 1 anna each, 10 annas per dozen V. P. Extra.

P S—When buying see the name carefully *Otto-Dilbahar*.

**ANGLO-INDIAN DRUG & CHEMICAL CO.,**

155, Jumma Musjid, Market, BOMBAY.

## Part II.

A brief summary of the Industrial Activity in India  
during twelve months

*December 1915 to November 1916.*

### SECTION A.

*The Government of British India and Indian States*

#### General

The Secretary of State for India has created a new appointment in Research for Dr. Jagadish Ohandra Bose of Calcutta in recognition of his important contributions to the progress of Science

The Bengal Chamber of Commerce has recommended tanning and dyeing industries as suitable subjects for the grant of State Technical Scholarships, as they find that the students who have so far returned to India after completion of these courses have been well-provided for on their return

It would appear from the Report submitted by Mr. Peter Abel, who was specially invited by the Government of India to investigate the question of Indian sugar industry, that the existing Indian sugar factories can be brought to the level of those in Java with a few additions and modifications.

The possibility of reviving the silk industry of India is now engaging the serious attention of the Government of India. With the approval of the Secretary of State, Mr H. Maxwell Lefroy has been appointed to the temporary post of Imperial Silk Specialist and he will possibly visit Japan and French Indo-China for studying silk industry.

The opening speech of His Excellency Lord Chelmsford in the Imperial Legislative Council contains a masterly survey of the industrial condition, the agricultural progress and other economic questions affecting the welfare of India, which is a clear indication of the care bestowed and the importance attached even by the highest Government officials to industrial matters.

The Non-official Members of the Imperial as well as Provincial Legislative Councils are rendering excellent help to the cause of

education and economic development of the country by making valuable suggestions and by eliciting information on important questions. The whole country is indebted to the Hon'ble Sir Ibrahim Rahimtulla for recommending the appointment of an Indian Industrial Commission, which is certainly one of the most notable events of the year. Very valuable results are expected from this Commission, and the work of investigation into the resources and Industrial possibilities of India will, it is hoped, greatly facilitate the future industrial progress of the country. The commission which is appointed by a Resolution dated 19th May 1916, Simla, is composed as follows.—

### President.

Sir T. H. Holland, K C I. E., D Sc., F. R. S., President of the Institution of Mining Engineers.

### Members

Mr. E. Hopkinson, Mr. O. E. Low, Mr. Alfred Chatterton, Sir Dorab J. Tata, Sir Fazulbhoj Currimbhoy, Pandit Madan Mohan Malaviya, Sir R. N. Mukerjee, Mr. T. H. Stewart.

### Secretary.

Mr R. D. Bell, M. A., B Sc.

This list is composed of very experienced gentlemen, and we hope that some tangible good will accrue to the country from the labour of this Commission, which has kept a very comprehensive programme of work before it.

The questions drawn by the Commission for the examination of witnesses cover a very wide range and embrace almost all problems of any importance under the following heads:—

- (1) Financial aid to industrial enterprises.
- (2) Technical aid to industries.
- (3) Assistance in marketing products.
- (4) Other forms of Government aid to industries.
- (5) Training of labour and supervision.
- (6) General and special administration and organization.
- (7) Organization of Technical and Scientific departments of Government.

(8) Government organization for the collection and distribution of Commercial intelligence.

(9) Other forms of Government action and organization.

It would be premature to say anything about the Commission until it concludes its labours and submits its report.

The Railway Conference, at which delegates from all parts of India were present was opened in the Council Chamber at the Government House, Calcutta, Sir George Barnes presiding. There were 36 delegates in all who took part in the discussion of various important questions.

Mr. Kapilram H. Vakil of Bombay has been awarded a first class Research fellowship under Professor Knecht of Manchester.

Professor O. J. Hamilton, Lecturer in Economics at the Calcutta University, has returned to India after a four months' tour in Japan, where he had been specially deputed by the Government of India to study the recent economic developments in that country including her cottage industries. According to Professor Hamilton, it is the members of the farmer's house-hold or cottage-dwellers who are doing most of the industrial work of Japan and it is from these beginnings that the large scale enterprises are gradually built up. We await with interest the full report of Professor Hamilton.

On the 24th February last, His Excellency Lord Pentland opened the Commercial Museum at the Imperial Secretariat Building, Calcutta. The main object of this Exhibition is to display samples of the principal articles of foreign manufacture, which are now imported into India, side by side with samples of corresponding Indian manufactures with their prices. It appears from catalogues issued by the Museum authorities from time to time that the Indian manufacturers are taking advantage of this Exhibition to advertise and introduce their wares into Indian and if possible in foreign markets. An inquiry office has been attached to this museum which gives information regarding these exhibits. The Exhibition authorities have been successful in collecting specimens of almost all the important industries in the country.

The question whether the Railways in India should be managed by the State or by Companies has been more than once discussed in the Imperial Legislative Council and also in the press. In reply



to the interpellation at the second debate in the Council, the Hon'ble member in charge of the Railway Department said that the Board were carrying out a departmental investigation of the question. This investigation, it appears, has now been completed. In order to determine whether State or Company managed lines have rendered better service to the public, the Board have framed a set of questions to be answered by Chambers of Commerce.

The Government of India have issued a Press communique regarding the particulars of scholarships granted by them to students going abroad for study.

- (a) Two scholarships of £ 200 to 250 to be awarded annually by the Universities.
- (b) Ten technical Scholarships of £ 150 to be awarded annually to statutory natives of India
- (c) One Scholarship of £ 200 or 250 to be awarded annually to a male student of the domiciled community
- (d) Two Scholarships of £ 250 to be awarded annually for the study of Oriental languages
- (e) One Scholarship of £ 250 to be awarded annually to a female candidate of the domiciled community
- (f) One Scholarship of £ 200 to be awarded annually to an Indian woman graduate.

The third session of the Science Congress was held in the Senate Hall of the Medical College, Lucknow, in the second week of January last under the Presidency of Col. Sir Sidney Burrard, Surveyor General of India, and eminent scientist. Sir James Meston, the Lieutenant Governor opened the session with a speech dealing with the importance of scientific advice and research.

The Indian Committee of the Imperial institute has been authorized by Mr Chamberlain to report on the possibilities of extending the industrial and commercial utilization of Indian raw materials in the United Kingdom and elsewhere in the Empire. Sub-committees have been appointed to deal with more important groups of materials and to carry on investigations. The leading merchants, manufacturers and users of Indian raw products have already been approached.

Messrs. D. T. Ohadwick and Black have been deputed to Russia from Madras for the promotion of direct trade with that

country. It is likely that these gentlemen will visit also, France, on their return from Russia. Other business men may join Mr. Chadwick's deputation to France at their own expense, if they choose to do so.

The Government have addressed a series of questions to the Chambers of Commerce in India and propose to hold a Conference of these Chambers at Delhi to discuss the questions of trade after the war.

An expert has been secured by the Government of India to study the problem of the revival of the natural indigo industry. It is now the duty of planters to adopt some co-operative system of manufacture and marketing to place this industry on a firm basis.

A tanning expert has also been engaged and has arrived in India with a small extract plant and is conducting an investigation into the tanning materials yielded by various forests in India with a view to prepare tanning extracts for trial on a commercial scale.

The Secretary of State has appointed Mr W. Davis as special indigo chemist in the Agricultural Department with a view to the standardization of the natural indigo.

In connection with the part played in modern Germany by scientists for the development of industries, the following reply was elicited by the Hon'ble Mr. M. B. Dadabhoy to his question at the last session of the Imperial Legislative Council —

"The Government of India believed that the industrial development of Germany has been due in part to the researches of Scientists employed by the owners of German industrial establishments and not by the State."

In regard to the Hon'ble Mr Dadabhoy's suggestion to appoint strong Boards of Scientists at the provincial head-quarters for research work, the Government of India propose to await the report of the Indian Industrial Commission.

In reply to the question which the Hon'ble Maharaja Sir Manindra Chandra Nandi, asked at the last meeting of the Imperial Legislative Council, the following statement giving the numbers of Agricultural experimental and demonstration farms on

the 1st of January 1915, in the various Provinces of India was furnished by the the Hon'ble Mr. C. H. A. Hill :—

Province	No. of farms.
Madras	11
Central Provinces	14
United Provinces	21
Punjab	6
Burma	11
Assam	5
Bengal	8
Bombay	34
Bihar and Orissa	7

---

Total .. 117

A Conference on Agricultural Education was held at Pusa last February, under the Presidentship of the Hon'ble Mr. Claude Hill. Several important resolutions were passed and to give effect to the recommendations of the Conference, the Government of India have addressed a circular letter to local Governments and administrations inviting their opinions. The Conference considered the question of Agricultural education mainly under two heads. (a) Agricultural Colleges, and (b) Agricultural instruction to the sons of Agriculturists. The Vernacular courses should be placed under other Agencies such as Deputy Directors or farm Superintendents and shall be separated from Agricultural Colleges.

### Bombay.

The licenses granted to the gentlemen named below for prospecting for minerals within the Bombay Presidency have been renewed by the Governor-in-Council —

- (1) The Hon'ble Diwan Bahadur Sir Kasturchand Daga, of Kamptee.
- (2) The Hon'ble Mr M. B. Dadabhoy, C. I. E., of Nagpur.
- (3) The Godrej and Boyce Manufacturing company of Bombay.

The Hon'ble Mr. Dinshaw Eduljee Wacha has been appointed by the Government of Bombay a member of the Committee for Direction of Technical Education

Three public lectures on the cotton trade were delivered in February last by Professor J. H. Todd at the Sydenham College of Commerce and Economics, Bombay

His Excellency the Governor of Bombay has appointed Mr. H. Lancaster to the post of Inspector of Mines in the Bombay Presidency

Sir Frank F. Adam, formerly Chairman of the Bombay Chamber of Commerce, is appointed to consider the position of textile industries after the war

The Bombay Government have recently published a very interesting note on the sources of supply available in the Presidency for the creation of water-power. The possibilities of the important Irrigation works are indicated below:—

*Pravara Canal Project* at Bhandara in the Ahmednagar District. The dam is expected to be completed in 1921, and will contain 10 millions cubic feet of water. About 4 miles below the site of this dam there is a vertical fall of 200 ft. in the river bed capable of developing more than 3500 Horse Power continuously day and night or 7000 Horse Power for 12 Hours only.

*Godavari Canals* in Nasik District which are completed are likely to produce 400 H. P.

*Nira Canals* in the Bhore State are capable of yielding 1800 H. P.

A Department of Statistics has been opened at the Sydenham College of Commerce and Economics under Professor A. R. Burnet Hurst. It is the first of its kind established under the auspices of any University in India. Apart from the ordinary degree courses on the methods and application of statistics, this Department proposes to devote its special attention to the statistics of British India, in which facts as to population, trade, production, prices, wages, incomes &c. will be analysed. This course will be followed by one in international statistics. If circumstances permit a statistical Bureau will be opened with the aim of collecting and disseminating useful information among business people and other sections of the community.

## Madras

Sir Frederick Nicholson of Madras has succeeded in his experiment in the manufacture of soap from Fish oil. There are special facilities in the Madras Presidency for this industry. Fish oil soaps are used by coffee planters for killing coffee pests. The soap can be used for leather goods and several other purposes with slight modifications in its composition.

*Brick and tile making* employs nearly 13000 people in the Malabar and South Canara Districts which abound in suitable clays

The Report on the administration of the Madras Presidency for 1914-15 furnishes some interesting particulars —

*Spinning and Weaving Industry* —In addition to 16 large mills employing nearly 23000 persons daily, there are 50 small factories employing 50 hands each. A great amount of hand-loom weaving is still carried on, the total population engaged being nearly 4 lakhs. The fly-shuttle loom is now being more utilized than before, its capacity to give an increased outturn being satisfactorily demonstrated.

*Leather*—The tanning industry has prospered a great deal. Large quantities of hide which would ordinarily be exported to foreign countries were brought to Madras to be tanned there.

*Woodwork*—furnishes employment to nearly 150,000 people and is carried on as a cottage industry.

The Exhibition organised last Christmas was opened by His Excellency Lord Pentland. The object of the Exhibition was in the words of His Excellency "to make more widely known the great natural resources of the Presidency and Southern India generally, to secure a wider recognition of what has been and is being done to utilize them, to encourage artisans and craftsmen, to promote among them a fuller knowledge of methods, processes and appliances, to enable them to learn and profit by the skill of others." The Exhibition was divided into Agricultural, Forestry Sections, Fisheries Industries, Weaving, Health and Hygiene Sections.

We learn that the plant and buildings of the Madras Glass factory have been recently acquired by the Madras Government and that the factory has been reopened on a commercial basis. The

experiments of Mr J Narayenmurthi of the Department of Industries in manufacturing Soda water bottles capable of withstanding a pressure of 200 lbs. have proved successful

The Soap Factory attached to the Government Factory Station at Tanur has been removed to Calicut and will commence work shortly. The Government of Madras has sanctioned the sum of Rs. 75,000 for the improvement of the Factory and fresh machinery has been set up for increasing the output of the concern. This is the only factory of its kind under Government management.

The Government of Madras recently ordered a survey of cattle in the Presidency and have appointed a Deputy Director of Agriculture with practical experience in stock raising for the improvement of breeds of agricultural stock and milch cattle

### Bengal

Professor Jagadish Chandra Bose has recently completed Glen Eden Experimental station, at Darjeeling for introducing new methods of investigations into the conditions of plants of the colder climates. The establishment of this Research station has been sanctioned by the Secretary of State for India on the recommendation of the Minister of Education.

A Provincial Committee has been appointed to collect information in regard to Bengal industries for submission to the Indian Industrial Commission

An industrial and Economic Exhibition was held at Dacca, where the specimens of local industries of the Dacca and Chittagong Divisions were collected

### Punjab.

Through the efforts of the Forest Department of the Government of India, the experiments in the manufacture of Rosin and Turpentine have been successful. The articles now turned out are quite equal in quality to the imported specimens. The tapping operations are being developed as rapidly as possible.

The American cotton which had been sown in parts of the Lower Bari Doab Colony, Punjab has yielded very fine crops which have commanded better prices than ordinary varieties.

The opening ceremony of the Upper Jhelum Canal, was performed on the 9th December 1915 by His Excellency the Viceroy. This gigantic undertaking marks the completion of the Triple Canal Scheme, one of the greatest Irrigation projects in the world.

It is understood that the recommendation of the Punjab Government to help the Ambala glass industry which was submitted to the Government of India has been held in abeyance pending the report of Sir Thomas Holland Commission

Mr Renton Denning, Secretary to the Punjab Chamber of Commerce has been deputed by the Local Government for drawing up a report and furnishing details of the Industries of the Province of Delhi for submission to the Industrial Commission.

### C. P. and Berar.

The Secretary of State has sanctioned the inauguration of a Provincial University scheme on the lines of the Allahabad University.

A meeting was recently held at the Secretariat Library, Nagpur, to consider the question of weights and measures at the invitation of Mr Leftwich, the Director of Industries, C P, when it was decided, that there should be uniformity between Bombay and the C. P. weights and measures in regard to cotton and other articles.

### United Provinces

At the Dadri Industrial Exhibition held at Ballia in December last, the Government Weaving Institute of Benares arranged for a series of demonstrations of the different types of hand and fly-shuttle looms.

Important data have been collected by the Board of Industries, Cawnpore, in regard to the indigenous dye-stuffs available in the country and their dyeing value. Investigations in this line are also being conducted in the Madras Presidency and Mysore State and it is hoped that some practical solution will be arrived at by the discovery of some methods by which the difficulty at present experienced by mill-owners and hand-loom weavers all over the country for want of cheaper dyes will be solved at least to an appreciable extent.

A leather-working Government School was opened in Cawnpore in December 1915. The tuition is free to students between 12 and 16 years of age

The Dyeing School which has been opened at Cawnpore commenced its new session from 17th July last. The course, which will be thoroughly practical, will comprise the following subjects —

- I. The principal textile fibres—cotton, wool and silk—their chief chemical and physical properties with regard to the application of dye-stuffs
- II Boiling and bleaching of cotton, silk and wool.
- III. Practice in using the different dye-stuffs for producing fast colors &c.

It is also gratifying to find that out of 7 students of this school, who had appeared for the city and Guilds of London examination in Cotton Dyeing, 6 have passed, 3 having been placed in the first Division.

The Board of Industries, held their sixth meeting on the 14th of December last, at the Schools of Arts and Crafts at Lucknow.

From a Press-note issued we learn that an examination into the possibilities of certain oil-pressing plants by an expert has been concluded and that the Secretary of State has advertised for men to fill the posts of Glass experts. It also appears that correspondence is going on for the importation of dies and stamps for making metal lamps.

A kindergarten and educational Exhibition was opened at Allahabad by Lady Meston in February last, at the instance of Miss Burnett-Hurst when the importance of kindergarten system of Education for children was duly pointed out.

The eighth session of the Co-operative Conference of U. P. was held in the third week of February last, under the distinguished presidentship of Sir James Meston

At the eighth meeting of the Board of Industries, U. P., a detailed scheme for starting a class for toy making was discussed and it was decided that a toy-making class should be started,



## Burma.

An important scheme for the insurance of cattle against epidemics and other mishaps is now under the consideration of the Burma Government.

At a meeting of the Burma Legislative Council held in March last, a resolution was passed recommending the appointment of a special Committee for inquiring into the general conditions of stock breeding and to formulate a scheme for extension of co-operative principles to stock breeding operations.

## Baroda

The stearine manufacture and the Soap and candle industry has lately been revived with the help of the Baroda State and promises to be a successful venture. About 2000 lbs. of Mohua oil, are hydrolyzed daily, the Stearine and palmitic acids are used for candle making and glycerine is sold separately in the Bombay market at the rate of Re. 1 per lb.

From the Annual Report of the Department of Commerce and Industry of the Baroda State for the year 1914-15, we gather the following information:—

### Old Industries

- (a) Of the old industries of the State, the Alembic Chemical Work and the Naosari Pharmaceutical Works found a better sale for their wines, liquors and medicines.
- (b) The Slate pencil factory of Vaso secured large orders to such an extent that it could with difficulty meet the demand.
- (c) The China clay factory at Ransipur found a ready market at Ahmedabad for its refined clay as the European imports were stopped.
- (d) Hind Candle Works, got orders for candles.
- (e) The Dyeing factories were very adversely affected by the war.

### New Industries.

- (f) A new Mangalore Tile factory was started at Ajrai in the Ghandevi Taluka,

- (g) A small soap factory has recently started work at Baroda.
- (h) Two students were sent to Madras for training under Sir Frederick Nicholson, in pearl and oyster culture, fish curing and allied industries.
- (i) Loans amounting to Rs. 3,30,000 were granted by the State, out of which 3 lakhs were paid to a yarn mill for putting up 300 Looms and Rs. 30,000 to the Glycerine Factory at Gandevi.
- (j) The First Meeting of the Industrial Advisory Committee was held in August last under the Presidency of Rao Bahadur Khaserao Jadhav. In response to the circular letter, 101 suggestions were received.
- (k) A textile assistant and four demonstrators were working in the Hand-loom Department.

An Exhibition was organized at Baroda of Magazines and other periodical literature under the auspices of the State.

### Mysore.

Mr. Ohakrabarty, the soap expert engaged by the Mysore Government is investigating the prospects of this industry in the State. After eight months work, Mr. Ohakrabarty recommended the starting of a Soap Factory at Bangalore, and the sum of Rs. 15000 has already been sanctioned by the Mysore Government for the proposed experimental Soap work at Bangalore.

The Dasra Industrial and Agricultural Exhibition was held at Mysore as usual. Exhibits of the Department of Agriculture were numerous and were arranged and catalogued systematically. The Exhibition contained the following Sections.—

- (1) The Agricultural Section
- (2) The Machinery Section.
- (3) The Industrial Section
- (4) The Forest Section,
- (5) The Educational Section.
- (6) The Health Section.
- (7) The Geological Section.

There was also a fine and instructive display of Home Industries. In the Geological Section the specimen of Gold quartz, Copper ore, Manganese, Chrome, Bauxite and several other mineral specimens were kept on view. Exhibits were also received from Baroda.

The Mysore State contemplates the further expansion of its electric power to meet the rapid growth of consumption. There are two projects that offer themselves below the falls at Sivasamudram. When the projects are completed, it will be feasible to electrify the Railway from Bangalore to Mysore, and the power can be made available to the concerns at Madras.

In addition to the usual technical scholarships, the Mysore Government have sanctioned a number of scholarships for young men of artisan class engaged in practical work in factories or workshops. There are three scholarships of Rs 50 each, per mensem and several other smaller ones.

The Department of Industries in Mysore and Madras have been jointly carrying on investigations to determine whether it is possible to revert to the indigenous dye-stuffs of vegetable origin, which were formerly employed throughout the country. A large collection of vegetable material is being subjected to experiments for the purpose of ascertaining its dyeing properties.

The Mysore State proposes to open new schools of handicraft, where none are existing now. These schools will manufacture articles needed in the locality, employing daily labour to the necessary extent. 200 scholarships have been sanctioned to help the students.

The Mysore Economic Conference is now organising the development and encouragement of fruit cultivation for which the sum of Rs. 10,000 has been allotted.

It appears from the address delivered by the Diwan of Mysore at the last Mysore Economic Conference, that the following schemes have been undertaken by the Government and are progressing rapidly —

- (1) Increase in the production of Silk under the supervision of Signor Mori
- (2) Economic distribution of water by extending irrigation facilities.

- (3) The starting of a Cotton Mill in Mysore
- (4) A scheme for the manufacture of Iron and Steel, which is under investigation
- (5) Establishment of a Land Bank and the starting of Industrial guilds under the auspices of the Chamber of Commerce.
- (6) Affording pecuniary help to all promising schemes for the starting of industries, for which scope exists in the territory of Mysore
- (7) The working of the Sandal Oil factory

A deputation has recently been sent by the Mysore Government to Japan consisting of two officers and 6 commercial men, to study the methods of manufacture and business, adopted by the Japanese people

The Co-operative movement is spreading rapidly in Mysore State. In the year ending with June 1916, 103 new Societies were registered. The Industrial Co-operative Societies rose from 9 in 1914-15 to 29 in 1915-16. A new Provincial Bank has also been established.

The Department of Industries and Commerce of the Mysore State has helped the erection of machinery and plant to the value of seven lakhs of Rupees, of which no less than 5 lakhs are contributed by the people and the rest by the Government

The activity of the Department is mainly directed to the following problems —

- (1) Erection of power plants for lift irrigation.
- (2) Popularising sugarcane mills and manufacture of jaggery by improved methods
- (3) Provision of expert assistance for the erection of industrial concerns such as rice mills, oil mills, saw mills &c., in holding weaving demonstrations and supply of fly-shuttle looms.
- (4) Making experiments in soap making which has proved successful.
- (5) Development of tile industry, metal works, carpet making, bone manure, leather industry investigations with regard to paper pulp making, manufacture of

pencils, watch making and porcelain manufacture, glass industry, manufacture of paint, wood distillation &c.

The Government of Mysore has sanctioned the establishment of village savings banks in selected areas to see how far they succeed in attracting small savings of the poor classes to be utilized for industrial expansion of the State.

### Travancore

The Durbar of Travancore has sanctioned the amalgamation of the Department of Agriculture with the newly organized Department of Fisheries under Dr Kunjan Pillai, who will be known as Director of Agriculture and Fisheries. The Director hopes to add to the revenue of the State by the development of Fishery industry.

The Government of Travancore has sanctioned an allotment of Rs 15000 per year for a period of 5 years for technical scholarships with the object of improving the industries and developing the resources of the State.

The Durbar has under contemplation the survey of the State to ascertain the possibilities of economic development

### Cochin.

We understand that a beginning has been made this year in spreading in rural areas knowledge of various handicrafts and technical skill combined with rudimentary education.

### Rajputana States.

The enamelled glass work of the Pratapgarh State has begun to draw much public attention, and there is much scope for the expansion of this industry, if it is properly organised.

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## Part II.

### SECTION B.

#### *The Industrial Activity of the People.*

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#### General.

In the General industrial revival and economic activity of India, the Railway workshops are taking by no means an insignificant part. E I Railway locomotive workshops around which the model Town of Jamalpur has recently grown, are the most famous. Lahore, Kharagpur, Parambur are other centres, while at Bombay the workshops of the G I P. and B. B & C I. Railways are employing a large staff of workmen capable of turning out many parts and accessories which could not be made in India before

The activity of the people of different provinces can be gauged by a reference to the Appendices A and B—(List of Indian Patents and Joint Stock Companies registered during the year) in addition to the information given in this Section

The total number of Co-operative Societies in the country at present is about 15,000 with 744,000 members and a working capital of over 7½ crores of Rupees

During the 12 months ending April 1916, 125 new Companies were floated in India with an aggregate capital of 7 crores, of which 8 were Railway Companies, 42 Trading concerns, 3 Jute Mills and 3 Cotton Mills.

According to the figures furnished by the Chief Inspector of mines, the output of coal in India during 1915 was 6 Million Tons as shown below —

	Tons.
Assam .. ..	310,043
Baluchisthan ..	43,607
Bengal ...	4,975,460
Bihar and Orisa ..	10,771,356
Burma ... ..	25
Central Provinces .	253,118
N. W. F. Province .	60
Punjab . ..	58,000

Messrs. N. Powell & Co., have been honored by the Viceroy by being appointed Surgical Instrument Makers to His Excellency. This Company has risen to much importance within a few decades by its perseverance and tact.

From the literature which is supplied to the office of the Indian Industrial Conference from time to time, it appears that Indian Merchants' Chamber and Bureau of Bombay is silently doing much useful work of a practical kind.

The following subjects were dealt with by this organisation during the year 1915-16 —

- (1) To ascertain the percentage of fat in sweetened condensed milk.
- (2) Standardization of weights and measures.
- (3) The nominations of Hon'ble Sir Fazulbhoy Currimbhoy and Hon'ble Mr. Manmohandas Ramji as representatives of the Chamber on the Standing Committee of advisors for the replacement of articles of German and Austrian manufacture by the production of indigenous Industries.
- (5) Suggestion to the Railway Conference Association to simplify Railway rates for the benefit of Indian industries.
- (6) Exemption of pearls from payment of export duty
- (7) Opening up of African market for Indian manufactures
- (8) Trade policy after the War.
- (9) Wheat export.
- (10) Congestion on Railways and correct classification of goods.

The Chamber has recently addressed a letter to the Railway Board in regard to the Company vs. the State management of Railways in India.

Mr Meherali M Fakira has been elected a Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce, London. Mr. Fakira is already managing some of the Mills and Factories under the Agency of Messrs Currimbhoy Ebrahim and Co. of Bombay.

We have received a copy of the Price-list issued by the Superintendent of the Salvation Army Loom Factory and Industries, Morland Road, Bombay. It is an illustrated catalogue of the different patterns of Hand looms manufactured by the Salvation Army which are adapted for different kinds of weaving work.

Very useful and practical work is being done in Bombay by Mr G. K. Devdhar of the Servants of India Society and his colleagues in matters of co-operation, debt redemption and general education of the mill-hands and other labouring classes of Bombay.

It appears from the last Report of the Bombay Mill-Owners' Association, that the condition of this staple industry is not as satisfactory as it ought to be. The difficulties experienced last year in regard to the supply of stores, chemicals, dye-stuffs &c. continue unabated. Scarcity of coal is causing much anxiety. There appears to be some improvement in the education of the children of factory labourers, but these people do not avail themselves of the special facilities given to them, by the erection of special chawls for their better housing arrangements. There indebtedness still continues. The necessity of specialization in different lines and constant attempts at improvement in the quality of the articles specialised, is not recognised by Indian Mill-Owners. The Mill Owners' Association appreciates the value of commercial museums like the one recently opened at Calcutta under the auspices of the Commercial Intelligence Department and advocates a complete survey of the industries of the country.

In addition to the two weaving factories which are already working at Shikarpur in Sind, a third has recently been started, which manufactures cloth as well as cotton carpets.

We understand that a company is being formed at Bombay for the utilization of cotton waste. The new company which is being promoted by Messrs. Currimbhoy Ebrahim & Sons, proposes to weave coarse blankets and other articles from cotton waste.

More than 28 weaving and spinning Mills are now working partly or wholly with electric power supplied from the mains of the Tata Hydro-Electric Power Supply Co., Ltd. The example of those mills will very likely be followed by others.

The Trustees of the Wadia Fund have placed at the disposal of the Government of Bombay over a Lakh of Rupees for the endow-



ment of a chair in connection with the Sydenham College of Commerce and Economics.

The Report of the Bombay Swadeshi Co-operative Stores Ltd. bears testimony to the successful working of the concerns. The Society recently started a Branch at Poona in addition to three Branches which are already working in Bombay.

At the instance of the Registrar of Co-operative Societies, Bombay Presidency, a class to train the Secretaries of the Co-operative Societies, in Bombay, Deccan and Gujarath, has been organized this year by the Servants of India Society, Bombay and was conducted in the Society's Home, Sandhurst Road, Girgaum, from Wednesday the 23rd of August 1916 to Wednesday the 30th of August 1916 both days inclusive. The Class was held in the morning from 8 A. M. to 10 A. M. and, in the afternoon, from 2 P. M. to 5 P. M. and at night from 8 P. M. to 10-30 P. M. and worked under the direction of a Provincial Committee with Mr G. K. Devadhar, M. A., as Chairman, and Messrs Joshi and Thakkar as Honorary Joint Secretaries, in order to meet the expenses of the secretaries and other charges for conducting the *Training Class* in Bombay, the Registrar had provisionally promised to contribute a sum not exceeding Rs. 400. The course consisted of (a) twelve lectures on useful co-operative subjects in Marathi and Gujarati by members of the Provincial Committee, the Assistant Registrars Co-operative Societies and Auditors of the Department Messrs Gore and Setna, (b) half a dozen lectures illustrating the different processes of work, (c) visits to places of agricultural and co-operative interest in Bombay such as (1) Cotton mills, (2) Godowns of agricultural machinery and implements (3) Grain Markets, (4) Onion and potato depots, (5) Docks, (6) Cotton-green, (7) Half a dozen co-operative societies in Bombay, (8) The Bombay Central Co-operative Bank and (9) the co-operative houses in Gamdevi (d) these visits were followed by talks or short discourses by experts on subjects connected with these matters. At the end of the course, there was held an examination written and oral of the students attending the Training Class and those who obtained 50 per cent of marks were awarded certificates by the Registrar who had agreed to be present almost throughout the whole course. There were no fees charged for attending the Class.

Mr. Pherozsha E. Murzban has proceeded to Manchester to acquire a further knowledge of the art of weaving.

The opening ceremony of two Buildings erected in Bombay to perpetuate the memory of the late William Booth Tucker was performed by His Excellency Lord Willingdon the Governor of Bombay. One is intended for the accommodation of the King Edward Industrial Home for Europeans and the other is for a silk school and workshop.

The whole amount of the share capital viz 12 lakhs of the Mathuradas Mills, projected recently in Bombay has been subscribed.

The First Session of the Indian Commercial Congress was held in Bombay on the 26th December 1915 under the Presidency of the Hon'ble Sir Fazulbhoy Currimbhoy, who has formulated the whole scheme of the movement. The Hon'ble Mr. D E Wacha delivered a very illuminating address as the Chairman of the Reception Committee of the Industrial Congress. Important resolutions were passed at the Session, which will be found in the Report of the Congress which has already been published.

A Marathi class in Economic has been started by the Indian Economic Society of Bombay, to facilitate the study of economics. A nominal fee of Re. 1 only is charged for admission to the class.

Messrs. Tata Sons and Co., are undertaking a new Hydro-Electric Scheme for Bombay with a capital of about 2 crores, the scheme aims at the development of 60,000 electrical Horse power in Bombay for 3600 working hours per annum. The site selected for the New Scheme is about ten miles from the existing Hydro-Electric System.

The following Silk Schools are doing useful work under the auspices of the Salvation Army.

- (1) The Sir Michael O'Dwyer School at Simla
- (2) The Tata Silk farm at Bangalore.
- (3) The William Booth Memorial Silk School and Workshops at Bombay.
- (4) Sir Louis Dane Weaving and Silk School at Ludhiana

The Hon'ble Sir Fazulbhoy Carrimbhoy in the course of an address recently delivered by him at the Students' Union of the Sydenham College of Commerce, Bombay, pointed out the necessity

of founding Colleges for instruction in Marine and Railway Engineering. The need of education in the art of Ship-building and Navigation is recognised also by the Hon'ble Mr. D. E. Wacha, who advocated its importance in a recent speech.

The Servants of India Society is doing much practical work for the diffusion of industrial education, co-operation among labourers and other classes. It intends also to issue a series of pamphlets on the following subjects:—

- (1) Economic condition of the masses
- (2) Co-operation.
- (3) Indian Commerce and Industries.
- (4) Railways.
- (5) Indian Provincial Finance.

It is estimated that the cost of collecting reference books for the compilation of these pamphlets will be about Rs 10,000. Donations are invited by the Secretary, Servants of India Society, U. P. Branch, 6 Bank Road, Allahabad.

The Indian Economic Society which has recently been established in Bombay under the auspices of the Servants of India Society has drawn up a set of questions for the purpose of collecting information with a view to prepare a Memorandum to be submitted to the Indian Industrial Commission.

The Agents and Directors of the Tata Iron and Steel Company have decided to raise fresh capital for the extension of their works in order to make them an up-to-date concern so as to compete with the best manufacturing centres of the world.

### Madras.

At a meeting of the Madras Legislative Council a Resolution was moved by the Hon'ble Mr. B. N. Sarma urging the need of establishing a College of Commerce in Madras. The motion had to be withdrawn, as owing to the financial stress due to war the Government, who have under consideration the details of a College of higher Accountancy and auditing were unable to expedite its establishment.

Mr. P. K. R. Naidu was sent to England three years ago as Government of India Scholar for a practical and theoretical course in tanning. He has successfully completed his course and has secured honors from well-known institutions of England.

Mr. W. Subramaniam, the peripetatic weaving Superintendent of Madras calls the attention of his countrymen to a very interesting industry for the manufacture of gilt-jewels which is carried on (Wealth of India-June 1916 Page B. 17) at the Sinnalapatti village of the Madura District. All kinds of ornaments, are made there—ornaments for the ear, the nose, the neck and hands.

### Bengal.

In a village of the Ranaghat Sub-Division (Nadia District) the manufacture of fishing lines with eri and tussor Silk has recently been introduced as a Cottage Industry

A new Royal Exchange has been established at Calcutta, of which the foundation stone was duly laid by H. E. Lord Carmichael on 9th February last

With regard to the introduction of a system of uniform weights and measures the Calcutta Municipal Corporation have resolved that the standard weight should be the Seer, and should be fixed as equivalent to two pounds of English weight, that liquids should be sold by weight

The Button Factory at Dacca is rapidly developing, owing to the introduction of up-to-date plant for the manufacture of different kinds of buttons, and the industry is now in a position to compete fairly with articles of foreign make.

The University of London has conferred the Degree of Doctor of Science in Economics on Mr. Pramatha Nath Banerjee. His thesis upon 'Public administration in ancient India' has been well received. He is the first Indian to receive this honor from the London University.

The Twelfth Annual Meeting of the Central Council of the Association for the advancement of Scientific and Industrial education of Indians was held recently in Calcutta under the presidency of the Hon'ble Rai Sitanath Bahadur. We learn that owing to war, only six students were sent last year to foreign countries for study. Owing to this reduction the Government grant was reduced from Rs. 5000 to Rs. 2500. Out of the 18 students to be sent this year, 16 go to Japan, 1 to England, and 1 to America.

### Central Provinces.

The Jabalpore Glass Factory which has its works situated at Ghamapore, and which manufactures Bohemian Bangles, Medicine

phials, all sorts of Chimneys, Globes &c. has already secured gold medals at the Allahabad, Gwalior, Meerut and Navsari Exhibitions.

### United Provinces.

The North India Match Manufacturing Co., is the name of a new concern lately started at Barielly with a capital of 8 lakhs

A new Glass factory has been started at Bijnor near Moradabad by Lala Ishwardas, the manager of the Umbalal Glass works, the factory has already started work.

Mr H Stanley Jevons, Professor of Economics, Allahabad University has started a quarterly journal of "Indian Economics" which bids fair to be a successful enterprise

Paper Mill authorities at Lucknow invited Prof Nag of the Agra College and Prof. Shaligram of Muir Central College to try certain experiments with a view to manufacturing "bleach liquor" for the use of the Paper Mill. The "liquor" produced by these Professors was quite satisfactory and the Directors of the mill will render real service to the country if they give the professors facilities to manufacture it on a large commercial scale.

The results of prospecting for pitch-blende in the hills near Banukhap in the Nawala Sub-Division of the Gaya District, is said to be promising. The ore discovered there is declared as one of the richest in radium contents in the world. India will thus within a short time, make its regular contribution to the supply of radium.

The U. P. Industrial Conference was held at Jhansi on the 9th October, Lala Bishambar Nath presiding. The President expressed regret that the Indian Industrial Commission was not prepared to consider the vexed question of fiscal relationship between India and the rest of the Empire and foreign countries. Resolutions on important subjects were also passed.

### Punjab.

The newly discovered Petroleum fields at Khan promise to develop the petroleum industry, which is now in the hands of the Attock Oil Company.

The Salvation Army has recently started a new Silk School in Simla. The Government promised to the School a grant of Rs. 2000 to meet its initial expenses.

The Indian Chalk Pencil Company is the name of a concern started by Sardar Bagh Singh, B A. The chalks both coloured and white turned out by this concern are approved by the Punjab Government.

His honor Sir Michael O'Dwyer performed on the 15th March last, the opening ceremony of the electric power and light Scheme at Amritsar. The installations have been made by Messrs Siemens Brothers.

Punjab is fortunate in possessing a mulberry forest the only of its kind in the world. This forest is now being utilized by the Salvation Army, which has established a Silk farm attracting a large rural population.

### C. P. & Berar.

It will be a welcome news to the people of the C. P. and Berar that Cotton stalks which hitherto were regarded as quite useless can be used for the manufacture of paper.

### Mysore.

A New Cotton Mill with 2500 spindles and 500 looms is shortly to be started at Bangalore to be worked with electricity.

### Bhavnagar.

It appears from the Administration Report of the State that it possesses one spinning and weaving Mill, 6 cotton Presses, 16 ginning factories. The Bhavnagar Chemical Works which are located at Vartej, manufacture all kinds of tinctures, spirits, linaments and other pharmaceutical and chemical preparations.

### Patiala

Mr M. M. Goswami, the Mining Engineer in the employ of the Patiala State has been elected an Associate of the Institute of Mining and Metallurgy of London.

# APPENDIX A.

## INDIAN PATENTS.

### *Application for Patents.*



*T L A Runge*, for an improved process and apparatus for co-agulating raw caoutchouc, "milk "

*V G Nail*, for a combined chula and water heater

*F D. Bana*, for a pocket electroscope.

*K B Dadyburjor*, for a method of removing and collecting automatically gases formed in septic tanks

*S C. Das Gupta*, for a process for manufacture of potash sulphate from soda sulphate and saltpetre.

*Sitaram Narsing Ghate*, for an automatic sluice gate.

*K. C Bhappu*, for improvements in the constructions of bottles and other narrow necked vessels

*K Kottman*, for improvements in roofing for tropical countries

*B A Minwalla*, for sun brand or suryya chhap candles

*J. Bharatia*, for a low speed horizontal flour mill

*A. K Hodi*, for improvements in the casings of electric wires

*Bishambar Nath*, for an Indian Commode to suit Indian habits

*E. B. Daroowala and K. B. Daroowala*, for improvements in signals for motor cars.

*S A. Bhisey*, for improvements in shuttles.

*Ram Chand and Baij Nath Khanna*, for threshing machines.

*G. Chennaverappa*, for the slate pencil manufacture.

*Lakshmi Patti Misra*, for improved adjustable cramp for cramping the switch and stock rails of railways, tramways and other like permanent-ways where points and crossings are required

*Chiman Lal Balabhar Cholski*, for a nut-cracking machine

*H Alladin and H A Aziz*, for an improved padlock.

*B K Gupta*, for double bolts and for doors and windows on single action.

*Banwari Lal Alia and Sons*, for fire and storm-proof tale chimneys suitable for 10, 14, 20, 30, 40 and 60 sizes of lamps.

*J N Sanyal and W. S Street*, for the "Sanyal" rapid paint remover.

*R. M. Vaz*, for a humidifier, treble nozzle

*A. A Bachamann*, for improvements in stoppers or closing means for vessels for containing petrol or other volatile liquids

*Ishar Das Verma*, for a Rotary oil mill.

*H. H. Das*, for travelling and domestic cooker

*T V Bhatt*, for an improved water lift.

*R L Datta*, for manufacture of chlorine.

*Gordhandas Magan Lal and Nathubhai Mulchand Jariwala*, for an improved machine for embossing gold and silver flat wire.

*Benoy Krishna Gupta*, for combined shutter regulator and protector of Jambs of doors and windows

*Petai U Pakir Moideen*, for an iron travelling box

*N T Jadhava*, for handloom of double-fly shuttles

*B. S. Joq*, for a simplex vulcanizer.

*C L Khannah & Sons*, for an improved perpetual calendar

*E. B Daroovala and K. H Daroovala*, for improvement in spigot cocks

*C. S Biwai*, for improvements in tea rollers

*S M. Rutnagur*, for improvements in camp beds, stretchers and the like

*S B. Desai*, for a double pointed writing nib

*Hira Lal Ghose*, for a wash down latrine seat.

*Vilayat Husain, Haji Ramzan Ali, and Mohamad Husain*, for jointless sugar filter sheaths

*Ramaswami Naikan and Nallakannu Asati*, for a loop spring Indian drum

*S S Sastri*, for Telegu typewriter.

*K S Sangham*, for universal impeller.

*W H Biddle*, for an improved method and apparatus for automatically compensating the expansion, or contraction of wires, rods, or the like



*Mohamad Ali Khan and Mohamad Abdul Kadir*, for pneumatic cycle stands

*J I Panchal*, for a water cock.

*S K. Roy*, for improvements in paddy huller.

*S A. Kapadia*, for an improved process and apparatus for preserving fruits, vegetable, grain and other organic substances.

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# APPENDIX B.

## List of Joint Stock Companies Registered during 1916.

No	Class and Name	Situation of Registered Office	Objects	Authorised Capital
	<b>I—Banking Loan and Insurance.</b>			Rs
1	Chulmari Loan Office .	Bengal	Money-lending ...	50,000
2	Baberbund Jorai's Bank .	"	Banking ...	50,000
3	Siliguri Loan Office, Ltd	Calcutta, Bengal	Money-lending ...	50,000
4	Hindu Monthly Saving Fund, Seventh Branch ..	Georgetown, Madras	Money-lending ( mutual )	1,68,000
5	Sri Navanitha Krishna Sahaya Prize Nidhi . ..	Tuticorin, Madras	% " ...	50,000
6	British-Sikkim Endowment and Charity Company	Bengal	Provident Insurance business	50,000
7	Trading and Banking House	Lucknow U Provinces...	Banking, etc	1,50,000
8	Mutual Investment Fund	Madras	"	6,00,000
9	Coimbatore Union .	Coimbatore, Madras	Loan and Banking	3,00,000
10	Adambakam Hindu Dhana Sekara Nedhi .	Pudupet, Madras	Money-lending ( mutual )	1,23,000
11	Karimganj Dhana Sampad	Karimganj, Assam	Banking and money-lending	20,000
12	National Loan Company	Bengal	Money-lending ...	50,000
13	Khayerabad Loan Office	"	Banking ...	20,000
14	Trust of India ..	Simla, Punjab	Banking, etc ..	50,00,000

*List of Joint Stock Companies Registered during 1916.—(Continued).*

No	Class and Name	Situation of Registered Office	Objects.	Authorised Capital
<b>I—Banking and Loan Insurance</b> (Continued)				
15	Sri Krishna Agency	Ahmedabad, Bombay	Banking and Commission Agency	50,000
16	Peelamedn Radhakrishna Bank	Peelamedn, Madras	Banking and Loan	1,00,000
17	Zeuth Life Assurance Company	Bombay	Life Assurance ..	1,00,000
18	Baradia Uthali Bank	Baradia, Bengal	Money-lending...	50,000
19	Nator City Bank	Nator City, Bengal	Banking	50,000
20	Naogaon Union Bank	Bengal	Banking and Money-lending	50,000
<b>II—Trading.</b>				
21	Futwah-Islampur Light Railway Co.	Calcutta, Bengal	Construction of a Railway from Futwah to Islampur	12,00,000
22	Choparmukh-Selghat Railway Co	"	Construction of a Railway from Choparmukh to Selghat	23,00,000
23	The Adarsha Knitting Co., Ltd.	"	Import of knitting machines, machinery and other articles	1,00,000
24	Macbeth Brother and Co., Ltd.	Bombay	To construct and execute public work and conveniences of all kinds	5,25,000
25	Walter Bushnell, Ltd	Calcutta, Bengal	To carry on the business of manufacturing ophthalmic opticians	1,00,000

26	Bengal Steam Laundry Co , Ltd. ...	Calcutta, Bengal	To carry on the business of washing and ironing clothes, etc.	35,000
27	The Motor Exchange, Ltd.	"	To carry on the business of manufacturers and importers of Automobiles Motor Cars, etc.	1,00,000
28	Oriental Chemical and Pharmaceutical Works, Ltd.	"	To carry on the business of manufacturing chemicals, drugs, oils, etc.	25,000
29	Kolna-Bagurhaut Railway Co.	Ahmedabad, Bombay	Working and constructing Railways	9,00,000
30	Land Development Syndicate	Bengal	Carrying on the works of Dharma Samavaya and Agents in General.	1,00,000
31	Salt and General Trading Co.	Gorakhpur, U. P.	Trading in salt and other articles	50,000
32	Gujarath Cattle Breeding Co.	Kanpitt, Bombay	Purchasing, breeding and selling cattle	5,00,000
33	Madras Leather, Co.	George T., Madras	Manufacturing leather	2,00,000
34	Malbar Economic Union	Madras	Exporting & Developing Industries	1,00,000
35	Calcutta Chemical Company	Calcutta, Bengal	Starting Chemical and allied Industries	20,000
36	Arya Vypai Mandal	Rareilly, U. P.	Manufacturing shoes, etc.	10,000
37	Eastern States of Central India Export Trust Company	United Provinces	Developing the resources of the States	3,00,000
38	Nellore Motor Service Company	Nellore, Madras	Carrying passengers	30,000
39	Calcutta Decorating Company	Calcutta, Bengal	Decorating, Engineering, etc.	20,000
40	International Trading Co.	Bengal	Trading Agency	1,00,000
41	William Heath	Calcutta, Bengal	Tailoring, Outfitting etc	70,000
42	Oriental Agency Company	Bengal	General trade	9,000
43	Ganges Transport and Trading Co.	Calcutta, Bengal	" " Ayurvedic medicines	1,00,00,000
44	Arya Ayurved Bhandar	Bengal	Manufacturing	30,00,000
45	Sports ...	Lahore, Punjab	Manufacturing Sporting goods	30,000

*List of Joint Stock Companies Registered during 1916.—(Continued.)*

No	Class and Name.	Situation of Registered Office	Objects	Authorised Capital
	<b>* II—Trading —Continued.</b>			Rs.
46	Hotels of India	Sunla, Punjab ...	Hotel Keeping etc	30,00,000
47	M Minck & Company	Lahore, Punjab	Carrying on business, jewellers, silver smiths ...	40,000
48	Western India British Co	Bombay	Manufacturing Bricks, etc	3,50,000
49	Authra Valley Powers Supply Co	"	Supplying Electricity	2,10,00,000
50	Cooper Brothers	"	General merchant and Commission agents ...	25,000
51	Hazaribagh Motor Service Co	Hazaribagh, Bihar & Orissa	Carrying passengers and goods	1,00,000
52	F F Gordon	Bombay	General Printing, Publishing	3,00,000
53	Larkanna Jacobabad (Sind) Light Railway	Karachi, Bombay	Constructing Railway etc	30,00,000
54	Indian Planter's Agency Co	Bengal	General trade and agency	20,000
55	Bansdoha Bangore Fishery Co	"	Selling fish etc	10,000
56	North India Matches	Bareilly, U P.	Manufacturing matches, selling timber, etc	8,00,000
57	Swadeshi Dukan (Private)	Ferozpur, Punjab	Trading in Swadeshi goods	50,000
58	Kathewad Metal Works Company (Private)	Bombay	Manufacturing hardware	20,000
59	Oriental Chemical and Pharmaceutical Works, Ltd	Calcutta, Bengal	To carry on business of manufacturing chemicals, drugs, oils, etc	25,000

60	Bina Press, Ltd	...	..	..	Printing business	..	15,000
61	The Katakhal-Lala Bazar Railway Company	...	..	..	Constructing Railway from Katakhal to Lala Bazar	..	10,00,000
62	Land Development Syndicate	..	..	Bengal	Carrying on the works of Dharma Samavaya and agents in general	..	1,00,000
63	Calcutta Produce Company	..	..	Calcutta Bengal	General trade	..	3,10,000
64	M Bhattacharya & Co (Comilla).	..	..	Bengal	"	..	20,000
65	Dee Company	...	...	Myanaunug, Burma	"	..	20,000
66	Pyne Hughman & Co	...	...	Calcutta, Bengal	Engineering, contracting works, etc	..	3,10,000
67	Skippers & Co	...	...	"	Manufacturing Chemical drugs, etc	..	3,20,000
68	D. Waldie & Co	...	...	Konnagar	General trade and agency	..	5,00,000
69	Barisal Trading Co	...	...	"	General trade etc	..	20,000
70	H B Blackburn	..	..	Calcutta	Dealing in rice, wheat, etc	..	6,00,000
<b>III—Mills and Presses</b>							
71	Madhao Rao Sindia Mills	...	..	Bombay	Manufacturing Cotton, etc	..	12,00,000
72	Sir Shapurji Broach Mills	...	..	"	"	..	50,00,000
73	Madura Sonrastra Srram Mills Co	..	..	Kalyanapuram, Madras	"	..	6,00,000
74	Orient Jute Mills Company	..	..	Calcutta, Bengal	Spinning, weaving	..	1,00,00,000
75	Ganges Manufacturing Co	..	..	"	Jute, etc	..	51,00,000
76	India Jute Company	...	...	"	"	..	37,50,000
77	Delhi Flour Mills Company	...	..	Delhi	Manufacturing and dealing in flour, etc,	..	8,00,000
78	Sri Maheswara Gin and Rice Factory	...	..	Guntur, Madras	Milling rice ginning cotton, etc	..	26,500
79	Mathradas Mills	...	..	Bombay	Spinning and Manufacturing cotton	..	12,00,000

*List of Joint Stock Companies Registered during 1916—(Continued.)*

No	Class and Name	Situation of Registered Office.	Objects	Authorised Capital.
	<b>III—Mills and Presses.—Concl'd.</b>			Rs.
80	Bengal Rice Mills	Bengal	Owning Mills etc	1,00,000
81	Caledonian Jute Mills Co., Ltd.	Calcutta, Bengal	Jute spinning, pressing, weaving and baling	19,00,000
82	Lothian Jute Mills Company	" Amritsar, Punjab	Spinning, baling, weaving and pressing jute	20,00,000
83	Kotumal and Sons	"	Erecting Flour Mills	20,000
84	Nimar Cotton Company	Bombay	Ginning and pressing cotton, etc.	2,00,000
	<b>IV—Tea and other Planting Companies</b>			
85	Byreah Estates	Calcutta, Bengal	Planting indigo, etc.	5,00,000
86	Gahpur Tea Company	"	Cultivation and Manufacture of tea	6,00,000
87	Darjeeling Doorga Tea Co.	Bengal	"	1,50,000
88	The Jutibari Tea Co., Ltd.	Calcutta, Bengal	Planters and Manufacturers of tea, cotton, etc	5,00,000
89	Try your Luck, Ltd	"	The business of cultivation, art and industries	20,000
90	Sirassia Tea Co., Ltd	"	Cultivation, manufacture, and sale of tea	3,00,000

91	Panachuoi Tea Company	..	" "	..	Planting tea, etc.	..	4,00,000
92	Sonabheel (Assam) Tea Co	..	" "	..	"	..	2,50,000
93	Kharibari Tea Company ..	..	" "	..	Manufacturing tea etc. ..	..	1,50,000
94	Puriahpore Company .	..	Siliguri, Bengal	..	Cultivating sugar, indigo, etc	..	12,00,000
95	Oriental Tea Company ..	..	Calcutta, Bengal	..	Planting and manufacturing tea, coffeee, cinchona, cocoa, etc	..	2,00,000
96	Dhunsuri Tea Company ..	..	Calcutta	..	" "	..	6,00,000
97	Bijni Doears Tea Company	..	" "	..	" "	..	6,00,000
98	Dedibru-Dariang Tea Company	..	Dibrugarh, Assam	..	Planting tea, etc	..	7,50,000
99	New Darang Tea Corporation	..	Calcutta	..	" "	..	1,50,000
100	Bombay-Uganda Syndicate	..	Bombay	..	Planting tea, cotton, etc	..	2,00,000
101	Land Investment Co .	..	Punjab	..	Working as a house and land proprietors	..	50,000
102	Rajgarh Tea Co	..	Calcutta	..	Planting tea, etc.	..	2,00,000
<b>V—Land and Building</b>							
103	Dalhousie Properties	..	Calcutta	..	Acquiring lands and buildings	..	10,00,000
104	The Rajghat and Furrowah Estates, Limited	..	" "	..	The business of indigo planters and Zamindari proprietors ..	..	2,00,000
105	Budaun Bar Building	..	Badaun, U P	..	Constructing buildings	..	10,000
<b>VI—Mining and Quarrying</b>							
106	Singbhum Chromite Co	..	Calcutta	..	Mining chromite ore	..	1,00,000
107	Waste Bengal Coal Co. ...	..	" "	..	Mining coal ..	..	1,00,000
108	Hpaungdwa Prospecting	..	Rangoon, Burma	..	Exploring, mining, etc	..	50,000
109	Rambhordas and Company	..	Bombay	..	Mining and quarry	..	50,000
110	Katni Standard Lime and Stone Company	..	Calcutta	..	Manufacturing lime cement, etc	..	50,000



*Last of Joint Stock Companies Registered during 1916—(Concluded).*

No	Class and Name.	Situation of Registered Office	Objects.	Authorised Capital
	<b>VI—Mining and Quarrying. Concluded</b>			Rs.
111	Apkar Collieries		Trading in and mining coal	8,00,000
112	Rajgaon Stone Company	Bengal	Trading in and mining stone etc.,	22,040
113	Lobapatti Coal Co	Calcutta	Mining Coal	60,000
114	S C. Mukerjee and Co	Bengal	Owing collieries and manufactur-	20,000
	<b>VII—Others</b>		ing lime cement	
115	Punjab Star Theatrical Company	Amritsar	Starting theatres	20,000

# Index to the Report of the Twelfth Industrial Conference.



## A

- Abel, P , 33, 34.  
Agricultural banks, app I, vii-viii, xi, xiv, xvii.  
Agricultural education, 21, app I, vii  
Agricultural policy, 4-6.  
Agricultural surveys, 4  
Agriculture, 1-3, 28-30, 37-38, 73, 143, 145, Intro., xxi.  
Agriculture and Commerce, app I, xxiv-xxv.  
Akbar, 96.  
Alkalies, 161-165.  
Aluminium industry, Sps , 14.  
Aniline dyes, 158.  
Annealing ovens, 123  
Annual Report, Sps , 32-34.  
Anstey, P., 21.  
Arnold, M , 18  
*Arthashastra*, Intro, iv.  
Asoka, 136.  
Atkinson-Dawson Enquiry, app I, xxv

## B

- Bacon, F , 173  
Bamboo furniture, 59.  
Bannerjee, J. N on Plantain Fibre Industry, 108, mentioned, 11, Sps.,  
37, Intro., xiv, xlx.  
Banerjee, M N., 109  
Bangles, manufacture of, 128-129.  
Banking, 183.  
Banking, currency and finance, Sps , 14-15  
Barber, Dr, 28  
Bee-keeping, 12-13  
Bentwood, manufactures in, 58-59.  
Bhargava, P. N on State aid, Intro., i, ii, iii, xx, xxvi, xxvii, Sps.,  
1, 7, 8, 37, 38  
Biharilal, M , Intro. ii.  
Booth, C., 17.

Bose, J. C , 167.  
 British Consular Service and India, app. I, xlv, Sps., 4.  
 Buddha, 70.  
 Byron, Lord, 1.

C

Camphor, artificial, 163  
 Cane-crushing, 52-53  
 Cane furniture, 59  
*Cane Sugar Industry, Past and Present* ( Grassig ) 24.  
 Capital, 181, Intro, v, Sps , 22-24.  
 Capital, and Co-operative Credit, Intro , xxi  
 Carlyle, T , on the gospel of work, 1, on the definition of man, 142  
 Carmichael, Lady, Sps., 30  
 Caspar, 17.  
 Chanakya, Intro. iv, Sps , 18.  
 Chandra, Dr H , on the Value of Research, 170, Sps , 37, Intro xiii.  
 xix, xxi  
 Chandragupta, 136.  
 Chuwdhary, M. G , 169.  
 Chitrol, Sir V , Sps , 12.  
 Chemicals, for paper-making, 100-101  
 Chemistry, 143  
 Chlorine, 162  
*City Development* ( Geddes )  
 Clays, 101-102.  
 Coal tar colours, 164.  
 Coal-tar Dyes and India, 147-154, effect of the war on the dye consuming centres, 147, cotton mill industry, 147, history of the industry, 148-149, future of the industry, 150, vegetable dyes, 151, value and quantity of coal-tar dyes imported, 152, process of making coal-tar dyes, 153, possibilities in India, 154.  
 Columbus, C, 70  
 Comenius, K, 20  
 Commerce, 26, 171.  
 Commercial education, 21, app , I, x-xi, xiii.  
*Commercial Egg-Farming*, 11.  
 Congress of Commerce, app. I, xxi-xxii.  
 Constitution of the Conference, Sps , 5, 45-46, app. 1, xlviii-xxix.  
 Co-operative Audit fees, app. 1, xxvii.  
 Co-operative Banks, app. 1, xi, xxviii  
 Co-operative Credit, 69-71, growth of, 71, meaning of, 71-72, essentials of, 72  
 Co-operative Credit Societies, app. 1, xxi.  
 Co operative dairy, 12.

Co-operative Stores, 75-76.  
 Cottage industries, in Berar, 87.  
 Cottage industries, Sps , 4, 29-30, app. 1, xxxvii, xlii.  
 Cotton, 77.  
 Cotton excise duty, app I, xi, xiv, xvi, xliii  
 Cotton industry, 8  
 Cotton mill industry, 147  
 Cotton spinning and weaving, app. I, viii.  
 Crew, Lord, Sps , 29  
 Crushing, 30-32  
 Currimbhoy, Sir F., Sps., 27.  
 Curzon, Lord, 6, 7, 13.

## D

Dager, H, 90  
 Delegates, list of, app. II, i-vii  
 Delitzsch, H S , 70.  
 Demonstrations, 61.  
 Departments of Industry, app. I, ix-x, xvii, xxvii-xxviii  
 Development of Minor Industries in India with Special Reference to Wood-  
 working Industries, 58-62, manufactures in bentwood, 58-59, cane and  
 bamboo-furniture, 59, wooden toys, 59-60, wooden bobbins, 60, gene-  
 ral education. 60 61, technical schools, 61, demonstrations, *ib*, raw  
 timber, *ib*,  
 Directors of Industries, app I, xxi  
*Directory of Indian Goods and Industries*, 66.  
 District Board Railways, app I, xxxv  
 Doraiswamy Iyengar, G., Sps , 35  
 Douie, the Hon'ble Mr , 182  
 Duty on alcohol, app I, xxii.  
 Duty on Sugar, app I, xviii  
 Dutt, R C., Sps., 17.  
 Dyes, vegetable, 151

## E

Early History of Co-operative Credit, its Main Principles and Advan-  
 tages and their Application to India, 70-73, idea of co-operative  
 credit, 69-71, growth of the movement in India, 71, meaning of  
 co-operative credit, 71-72, the first condition of forming a  
 Society, 72, forms and rules, 72-73, agriculture, 73, societies  
 in India, 73.

*Economics of a Deccan Village*, 3

*Economics of British India* ( Sarkar ) 114,

Economics of Indian Agriculture and Industry, 1-23, importance of agriculture and industry, 1-3, condition of India, 3, reforms called for, 3-4, a forward agricultural policy, 4-6, development of nascent industries, 6-7, the cotton industry, 8, the silk industry, 8-9, the sugar industry, 9-10, the textile industry, 10-11, minor industries, 11-13, labour problem in India, 13-17, general and scientific education, 14, State insurance to protect workers, 15-16, suggestions for tentative legislation, 16-17, vision of the future, 17, general education, 18, agricultural and commercial education, 21, conclusion, 22-23

Education, Intro xxii-xxiii.

Electricity, 144

Elementary education, 4.

Emery wheels, 128

Enterprise, Sps , 30.

Essential oils, 167.

Euripides, 20.

Evans, Sir A, 19

Excise duty, Sps, 3.

Exhibitions of Foreign and Indigenous Goods, app I, xlv.

Expert knowledge, Sps , 21-22, 181.

## F

Factory system, 49-52

Factory work, 145

Faculty of Commerce, app I, xxvii

Farr, Dr S, 17

Favoured nation treatment, app. I, xliii, Sps , 3.

Fibres, for paper-making, 99-100.

Fireclay, 124

First Three Essentials of Industrial Development and the Need for a Business Education, 181-184, capital, 181, business ability, *ib*, labour, *ib*, general education, 182, banking. 183.

Fiscal policy, Intro., xxvii

Free Trade, Sps , 28-29

## G

Gaikwar, H H. the, 63

Geddes, Prof. P. 21.

General education, 18, 60-61, 182

Gibbon, E , on agriculture, 1.

Gill, S , on the First Three Essentials of Industrial Development and the Need for a Business Education, 181, Resols , 37, Intro . xlv, xxi

Glass industry, its possibilities, 112-113, causes of failure and other remedies, 119-128, Sps 14

Glass making, Intro. xxx.

Glass Manufacture, 112-135, possibilities of the industry, 112-113, management, 113-114, training, 115-116, capital, 116-118, co-operation, 118-119, causes of failure and remedies, 119-120, site, 120, *ib*, materials, *ib*, plant and tools, 120-122, pots, 122-123, annealing ovens, 123, tools, *ib*, raw materials, *ib*, chemicals, 123-124, fireclay, 124, silica, *ib*, lime, *ib*, coal, *ib*, chemicals, 125, composition, 125-126, glass-ware, 126-127, blowing machines and presses, 127-128 Emery wheels, 128, manufacture of bangles, 128-129, difficulties: their remedies, 129-134, conclusion, 134-135

Glassware, 126-127

Godbole, Prof N N., on the Present Position of Indian Chemical Industries, 155, mentioned, Intro., xvii, xviii.

Goethe, J. W von, 17.

Gopal Menon, C, Sps, 34, 44.

Gore, 170

Govila, Lala B, on Coal-tar Dyes in India, 147, mentioned, Intro, xvi, xvii, xxxi

Grasses, 89-90, 90-91, 92

Gur, 31, 32, 33, 54-56.

## H

Hadis Scheme, 38.

Haggard, Sir R 3.

Hailey, the Hon'ble Mr., 28, 29

Halal, W T., on Insurance Drain on India How to Prevent it, 74, mentioned, Sps, 37, Intro, xi, xii, xxvii

Handlooms, app 1, i, xxvi-xxvii

Havell, E B, 9

Herbart, J F. 23

Hegel, G W F, 18

Henry, W, 144

Hobson, J A, 15

Holland, Sir J, 75, Sps, 2

Hulls, J 144

Hulme, W., 34.

Humboldt, Von, 20

Hunter, Sir W, Sps, 19.

Hussan, A, on Paper Manufacture, 94, mentioned, Sps, 37, Intro, xiii, xxix

Imperial Preference, Sps, 29

Importance of Modern Inventions and Discoveries, 142-146, effect of the progress of physical science, 142, agriculture, 143, chemistry, *ib*, medicine and surgery, *ib*, new forces, 144, electricity, *ib*, domestic use, *ib*, factory work, 145, traction power, *ib*, agriculture, *ib*, practical training, 146

- Indentured labour, Sps., 3-4 , app I, xxi-xxii, xliii  
 India and the War, Sps , 11-12  
 India, economic condition of, 3  
 Indian Banks, app I, xxx-xxxi.  
 Indian Chambers of Commerce, app I, xxv, xxxii  
 Indian Commercial Attaches, app , 1, xxxvii-xxxviii  
 Indian Factories Bill, app , I, xvi  
 Indian industries, 154 , Sps , 7-3 , app , I, xlii  
 Indian Made Pencils, Sps , 47  
 Indian Manufactures, app , I, 1  
 Indian Stores Committee, app I iv  
 Indian Students abroad, Sps , 4. —  
 Industrial Banks, app I, xlii , Sps , 5  
 Industrial Commission, Intro , iii, Sps , 1, 2, 15-16, 33, 43  
 Industrial condition, of India, Sps. 18-19.  
 Industrial development, 74-75, 170-172 181 , Intro , iv , Sps , 19.  
 Industrial enterprises, app., I, xix-xx, xxvi.  
 Industrial life assurance, 83  
 Industrial Survey, app. I, iv-v, vi.  
 Insurance, Intro , xxvii  
 Insurance Drain on India; How to Prevent It, 74-79, essentials of industrial development, 74-75 , a Co-operative store, 75-76 , insurance drain, 76-77 , cotton, 77 , skilled labour, *ib* , foreign insurance, 77-78 , indigenous insurance companies, 78-79  
 Insurance, foreign, 77-78.  
*International Sugar Journal*, 26  
 Inventions and Discoveries, importance of, 142-146  
 Irrigation, 43-45 , Intro , xxvi.

## J

- Jerrold, D , on the Australian soil, 8  
 Joint Stock Companies, app 1, xvii  
 Joshi, G V., 63.  
 Juvenal, 4

## K

- Kamath, M. S , Sps., 36  
 Karandikar, V R., Sps , 35  
 Keynes, J. M., Sps , 23  
 Khan, Saadat Ali, Sps , 10  
 Kinns, H E , on the Development of Minor Industries in India with Special Reference to Wood-working Industries, 58 , mentioned, Intro , xi, xxiv

## L

- Labour, 13-17, 77, 181, Sps, 20-21, Intro, xxvi  
 Land tenures, 3, 5.  
 Law, Sir E., 71  
*Leader (The)*, 73  
 Leather tanning, 168.  
 Life assurance, scope of, 80-83  
 Life assurers, hints for, 83-86  
 Lime, 124.  
 Luther, M., 70  
 Luzzati, M., 70, 71

## M

- Macdonell, Lord, 71.  
 Machine, for extracting plantain fibre, 108-110  
 Machinery, Sps, 24-26.  
 Machinery, for paper making, 97-98  
 Mann, H. H., 3, 4.  
 Manures, 46-48  
 Margraff, A. S., 170  
 Martin, M., Sps., 18.  
 Martin, General, 90.  
 Marvell, A., 6  
 Marx, K., 7  
 Max Muller, F., 70  
 McLeod, H. D., Sps., 23.  
 Medicine and surgery, 143  
 Mehta, C. V., Sps., 36, 43.  
 Mehta, J. K., Sps, 2, 34, 35, 43, Intro, xx.  
 Mendleeff, D. I., 173  
 Merchandise Marks Act, app. I, xvi  
 Mill, J. S., 18.  
 Mining, weaving and sugar industries, app I, xii.  
 Minor industries, 11-13.  
 Mining industry, app I, viii.  
 Misra, Pandit G., Sps, 7, 16, Intro, ii  
 Modern science, result of, 142.  
 Motya, 90, 92.  
 Mukerji, P. C., on Life Insurance in India, 80, mentioned, Intro, xi xii.  
 Mukherjee, Sir R. N., Sps, 17, 27  
 Mudholkar, R. N., Intro, xx, Sps, 2, 7, 32, 34, 35, 36, 43

## N

- Nascent industries, development of 6-7, Intro., viii-ix  
 Newman, J. H., 21.



Nicholson, Sir F , 71

Norton, T H , 150

*Note on the Improvement of Indigenous Methods of Gum and Sugar Making in the United Provinces, 35*

Note on the Improvement of the Indigenous Oil Industry in the Bombay Presidency, 185-190, area under oil seeds, 185, oil milks, 186-187, stock of seeds, 187, expansion of the industry, 187-188, area under oil seeds and sugar-cane, 189-190

*Notes on Sugar Machinery and Manufacture in Northern India ( Abel ) 33.*

Oil mills 186-187

Oil-seed industry, Sps 14

Oil seeds, area under 185, 189-190.

Oils, essential, 139-140

On Life Insurance in India, 80-86, scope of life assurance, 80-83, industrial life assurance, 83, hints for intending assurers, 83-86.

Organisation, Sps , 25-26

Oza, K L., on the Economics of Indian Agriculture and Industry, Intro., viii, xxi, xxii, xxiv-xxvi

## P

Palmerston, Lord , 176.

Pandit, Y G , 185, 186, intro , xx

Pandya, V S , Sps , 2, 43.

Panna Lal, Lala, on Glass Manufacture, 112, Sps , 37, Intro , xv.

Paper, duties on, 106

Paper Industry, 104-107, importance of paper, 104 causes of cheapness, 104-105, measures to meet the demand, 105-106, customs and octroi duties, 106, technical schools, 107, 94-95, old methods of, 95-97, Intro , xxix, Sps., 9-10

Paper Manufacture, 94-103, expansion of the industry, 94-95, old methods of paper making, 95-97, advent of machinery, 97-98, supply of raw material, 98-100, chemicals, 100-101, important clays, 101-102, sound commercial adventure, 102, conclusion, 102-103.

Perfume industry, centres of, 138, Intro., xxx

Perfume-yielding materials, 136-138

Perfumed oils, 139

Perkin, W H., 147

Pharmaceutical preparations, 169

Pitke, H. R , on Rusa oil industry, 87, Intro , xiii, Sps , 37

Plantain Fibre Industry, 108-111, chemical and mechanical process, 108; machine for extracting the fibre, 108-109, improved extractor, 109-110 profits from the fibre, 110-III, 10-13, Intro., xxx

Polytechnic College, app I, xlv

Possibilities of Perfume Industry in India, 136-141, India's raw products

- 136, perfume-yielding materials, *ib*, exports of perfume-yielding materials, 136-138, centres of perfume industry, 138, perfumed oils, 139, attars, *ib*, essential oils, 139-140, proposed factory at Kanauj.
- Potdar, G. N , 161, Intro. xviii.
- Poultry farming, 11-12
- Practical training, 146
- Present Position of Indian Chemical Industries, 155-169, Indian industries; 154, effect of the war, 155-159; sulphuric acid industry, 159-161; alkalis, 161-165, soap and candle making, 165-167, varnish and paint manufacture, 167, essential oils, 167, sugar industry, 167-168, leather tanning, 168, tannin extracts, *ib*, pharmaceutical preparations, 169.
- Proposals and Suggestions, summary of, Intro., xxi.
- Protection, Sps., 28-29
- Ptolemy, 70
- Pulp Manufacturing Industry, Sps., 13-14.
- Purchase of Stores, app. I, xii-xiii, xx-xxi, xlii, Sps , 4.

## R

- Rab, production of, 56.
- Raiffeisen, F. W., 70.
- Railway Management, Intro., xxvi , Sps , 1.
- Railway rates, app. 1, xi, xx, xxvii, Intro , iii, xxvi, Sps., 14.
- Raman Lal, Rai S , Intro , xxx
- Ramji, M , Sps., 2, 16, 43 , Intro , xx
- Ranade, M G., 63
- Rangaswamy Iyengar, A , Sps , 41.
- Raw materials, 175
- Raw material, for paper, 98-100
- Ray, P C., 159
- Resolutions, app I, i-xlv.
- Resources of India, Sps , 19-20.
- Revival of Industries, app.
- Robert, L. 96.
- Rotation, principle of, 50.
- Roy, Rai S , his Presidential address, Sps., 17-32, the war, 17-18, industrial condition of India, 18-19, requisites of industrial development, 19, resources of India, 19-20, labour, 20-21, expert knowledge, 21-22, capital, 22-24, machinery, 24-26, organisation, 25-26; State aid, 26-29, free trade and protection 28-29, Imperial Preference, 29; cottage industries, 29-30, enterprise, 30, conclusion, 30-32, mentioned, Sps., 2, 9, 16, 43 , Intro., i, iii, xxii, xxiii, xxvi, xxvii
- Roy, Ram Mohan, 70.
- Rubber, artificial, 163.
- Rural population, prosperity of, Intro. viii.

- Rusa Oil Industry, 87-93, small industries in Berar, 87, management, 88, still, *ib*, process, *ib*, collection, 89, grass, *ib*, species of economic grasses, 89-90, Motya and Sofya, 90; season for cutting the grasses, *ib*, oils, *ib*, grasses available, 90-91, Government revenue, 91-92, prices of Motya and Sofya, 92, cost of grasses, *ib* cost of fuel, 92-93, improvement 93
- Ruskin, J, on labour, 1, Suggestions for betterment, 16.
- Sanghu, R R. on the sugar Problem in India, 24, mentioned, Intro ix, xxii.
- Sant, M. B, on the Swadeshi Movement, 63, mentioned, Intro, ii, x, xi, xxi, xxix, Sps, 37.
- Sant, N. M, on the Importance of Modern Inventions and Discoveries, 142; mentioned, Intro, xvi, Sps, 37.
- Sarkar, J., 114.
- Say J. B, 18
- Sayer, W, 26, 32
- Schopenhauer, A, 70
- Schulze, 70.
- Science and industry, 170, 172-175.
- Scientific education, 14
- Seeds, stock of, 187.
- Shakespeare, W., on dignity of labour, 1.
- Shaw, B, 19
- ShivCharanLal, Babu, Sps., 37, 70, Intro., xi, xxii.
- Silica, 124
- Silk industry, 8-9.
- Silver, A. H., on business education, 184; mentioned, 140, Intro., xx
- Singh, H. D., on Paper Industry, 104, mentioned, Intro., xiii, xiv, xxx; Sps., 37.
- Singh, Babu M, on Suggestions regarding the Increase of Sugar Production in U P., Agra and Oudh, 37; mentioned, Sps. 37; Intro., ix, xxi, xxii.
- Small industries, methods for the encouragement of, Intro., vi-vii.
- Soap and Candle Making, 165-167.
- Sofya, 90-92.
- South Sea Bubble, 2
- Srivastava, J P., on the Possibilities of Perfume Industry in India, 136; mentioned, Sps, 37, Intro, xvi, xxx.
- Standing Committee, members of the, Sps., 5-6.
- Starch, 163.
- State aid, Sps, 26-29, Intro, xxvii.
- State insurance, 15-16
- Subramania Iyer, G, Sps, 1, 38, Intro., xx.
- Sugar, 33-36; manufacture of, 32-33.
- Sugar cane, acreage under, 24-36, varieties of, 45-46.

- Sugar-cane industry, 9-10, 38-39, 167-168; app. I, viii-ix, Intro., xxii; Sps., 14.
- Sugar Problem in India, 24-36, acreage under cane, 24-28, agriculture, 28-30, crushing, 30-32, manufacture, 32-33, sugar, 33-36.
- Suggestions regarding the Increase of Sugar Production in U. P. of Agra and Oudh, 37-57, agriculture, 37-38, sugar-cane industry, 38-39, sugar cultivation in the province, 40, sugar cultivation in Mauritius, 40-42, two main factors, 42-43, irrigation, 43-45, varieties of sugar-cane, 45-46, manures, 46-48, factory system, 49-52, cane-crushing, 52-53, boiling, 53-54, gur, 54-55.
- Sulphuric acid industry, 159-161.
- Swadeshi movement, 62-69, origin and growth of the movement, 63, the meaning of the movement, 64, responsibilities, 64, 65, causes of failure, 65, our duties, 66, markets for indigenous products, 66, scientific and technical education, 66-67, future of the movement, 67-68; conditions in India, 69, Intro., xxviii-xxix.
- Swift, J., 170.
- Sydenham, Lord., Sps., 41.

## T

- Tannin extracts, 168.
- Tata, J. N., 68, 175.
- Tata, Sir D., Sps., 17, 27, 33.
- Technical and commercial education, app. I, iv, vi-vii, xv-xvi, xix, xxvi.
- Technical and industrial education, app. I, x, xiii, xxxv, xlii, Sps., 2.
- Technical schools, 61, 107, app. I, 1, 2.
- Textile industry, 10-11
- Thackersey, Sir V D, Sps., 2, 16, 17, 39, 43.
- Timber, raw, 61.
- Times, (The)*, quoted, 77-78.
- Tolstoy, L, 70.
- Traction power, 145.
- Trained students, Intro., xxxi
- Treves, Sir F, on India, 3.

## U

- Unemployment, problem of, 15.
- Upasani, N. S., on the Improvement of the Indigenous Oil Industry in the Bombay Presidency, 185, mentioned, Intro, xx.

## V

- Valley of Kashmir* (Lawrence), 96.
- Value of Research, 170-180; science and art, 170, industrial development of India, 170-172, value of scientific and industrial research, 172-175; raw materials and corresponding industries, 175, utilisation of waste

products, 176-177, importance of analysis for manufacturers and business men, 177-178, consultation and advice, 178-180.

Varnish and paint manufacture, 167

Varro, M. T., 18.

## W

Waldie, D., 159.

War, its effect on industries, 155-159.

Waste lands, 4.

Waste products, utilisation of, 176-177

Watt, J., 144

Webb, Sidney, 16

Webster, D., Sps, 23.

Weights and Measures, app I, xiv, xvii, xxxii.

Welcome address, Sps, 7-16, Lucknow not an industrial town, 9, paper industry, 9-10, India and the war, 11-12, Lucknow Paper Mill, 12-13, pulp manufacturing industry, 13-14, sugar industry, 14, railway freights, 14, banking, currency and finance, 14-15, Industries Commission, 15-16

Welsbach, A. von, 173.

Wolff, H. 72.

Wood working, Intro, xxviii.

Wooden bobbins, 60.

Wooden toys, 59-60.

Wordsworth, W., 17.

## Y

Yule, Sir D, Sps., 22

## Z

*Zend Avesta*, I.

Ziervogel, 174

---

# Index to the Report of the Industrial Conference Work.

---

## A

Agricultural Education, Conference on, 38.  
Alembic Chemical Works, 44  
All-India Industrial Committee, 9  
All-India Shop, provision for, 6.  
Ambala Glass industry, 42.  
American Cotton, 41.  
Association for the Advancement of Scientific and Industrial Education, 55.  
Attock Oil Company, 56.  
Auditors' Report, 29-31.

## B

Bengal Chamber of Commerce, 33.  
Berar Victoria Technical and Industrial Society, 13.  
Bhavnagar Chemical Works, 57.  
Board of Industries, 43  
Boards of Scientists, 37.  
Bombay Central Co-operative Banks, 52  
Bombay Mill Owners' Association, 51  
Bombay Swadeshi Co-operative Stores, Ltd, 52  
Brick and tile making, 40.  
Button Factory (Dacca), 55

## C

Calicut Soap Factory, 41  
Cattle, insurance of, 44  
Cattle Survey, 41.  
China Clay Factory, (Ransipur), 44  
Circular Letter, app. C, 21.  
Commercial Museum, 35  
Conference of Chambers, 37.  
Co-operative Conference (U. P.), 43  
Cotton trade, lectures on, 39.

## D

- Dacca Industrial and Economic Exhibition, 41
- Dadri Industrial Exhibition, 42
- Dasra Industrial and Agricultural Exhibition ( Mysore ), 45
- Donations, 27-28.
- Dyeing School ( Cawnpore ), 43.
- Dye-stuffs, indigenous, 42

## E

- Employment Bureau, 6.

## F

- Financial aid to industries, 18, 34
- Foreign and Indian Markets, study of. 6
- Foreign training, facilities for, 6.

## G

- Glass Factory ( Bijnor ), 56.
- Glass Industry, 4.
- Godavari Canals, 39.
- Gujrathi*, (The), 7.

## H

- Hand-loom weaving, 6
- Hind Candle Works, 44.

## I

- Imperial Institute, Indian Committee of, 36.
- Indian Bank, 6.
- Indian Chalk Pencil Company, 57
- Indian Commercial Attaches, 6.
- Indian Commercial Congress, 53.
- Indian Companies Act, 13
- Indian Economic Society, 5, 53, 54
- Indian Economics*, 56.
- Indian Industrial Commission, 4, 5, 6, 16, 34, 37, 56.
- Indian Merchants' Chamber and Bureau, 5, 50.
- Indian National Congress, 1, 3
- Indian Patents, 58-60
- Indian Textile Journal*, 7.
- Industrial bulletins, 8
- Industrial Conference, constitution for, 8, 11, objects of, 9.
- Industrial Library, 8
- Industrial survey, 5
- Industries, organisation of, 7
- Intelligence Bureau, 8.

## J

Joint Stock Companies, 6, 61-68

## K

Kindergarten and Educational Exhibition ( Allahabad ), 43.  
King Edward Industrial Home, 53.

## L

Laboratories, 8  
Leather, 40.

## M

Madras Glass Factory, 40.  
Mangalore Tile Factory ( Ajrai ), 44.  
Mathurdas Mills, 53.  
Mysore Economic Conference, 46.  
*Mysore Economic Journal*, 6.

## N

Nasari Pharmaceutical Works, 44.  
Nira Canals, 39.  
New Cotton Mill ( Mysore ), 57  
North India Match Manufacturing Co., 56.

## P

Paper and paper pulp manufacture, 4.  
Pravara Canal Project, 39  
Products, marketing of, 18, 34.

## R

Railway Conference, 35.  
Railway rates, revision, 4  
Receipts and Disbursements, 24-25.  
Resin, manufacture of, 41.

## S

Salvation Army Loom Factory and Industries, 51.  
Scholarships, press communiqué on, 36.  
Science Congress, 36.  
Servants of India Society, 51, 52, 54.  
Silk industry, 33.  
Sir L. Dane Weaving and Silk School, 53.  
Sir M. O'Dwyer School ( Simla ), 53.  
Slate Pencil Factory ( Vaso ), 44.



Soap, manufacture of, 40.  
 Soap and candle industry, 44  
 Soap Factory ( Bangalore ), 45.  
 Spinning and weaving industry, 40  
 State aid to industries, 19, 34,  
 Statistical Bureau, 39  
 Stearine manufacture, 44  
 Stock-breeding, 44.  
 Sugar industry, 4,6  
 Swadeshi failures, 5  
 Sydenham College of Commerce and Economics, 52, 53

## T

Tata Iron and Steel Co , 54.  
 Tata Hydro-Electric Power Supply Co., Ld , 51.  
 Tata Silk Farm ( Bangalore ), 53  
 Technical aid to industries, 18, 24  
 Technological College, 6  
 Toy-making, 43.  
 Triple Canal Scheme, 42.

## W

Wadia Fund, 51.  
*Wealth of India*, 55  
 Weights and Measures, 42.  
 William Booth Memorial Silk School and Workshops, 53.  
 Wood work, 40.

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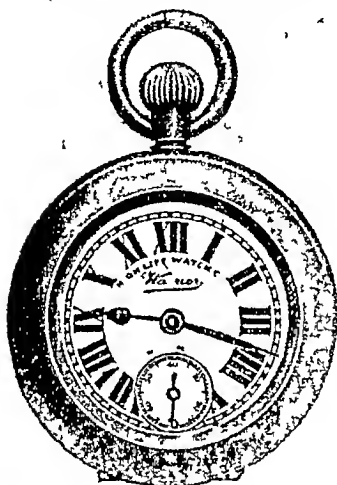
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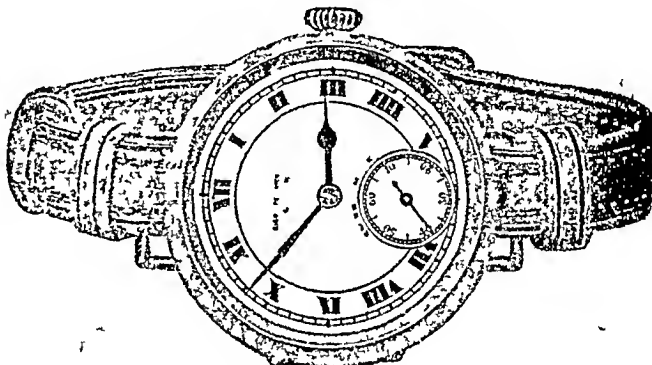
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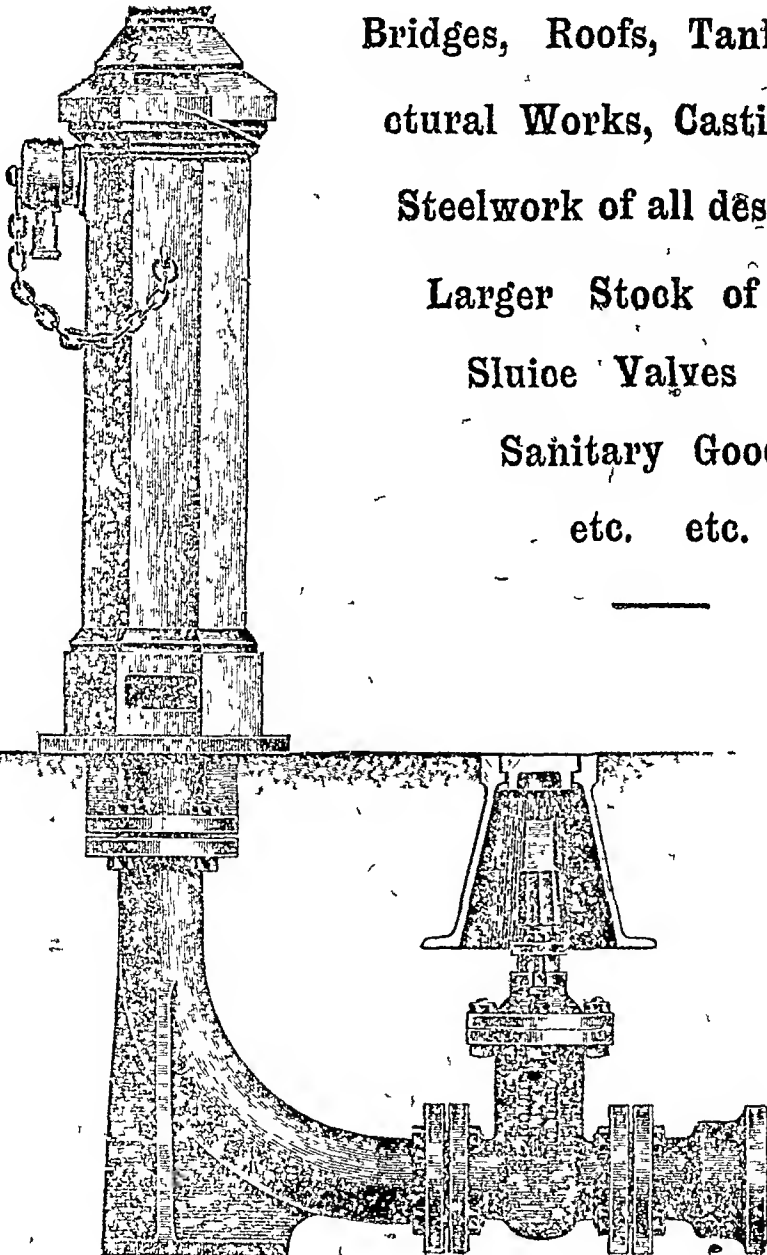
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